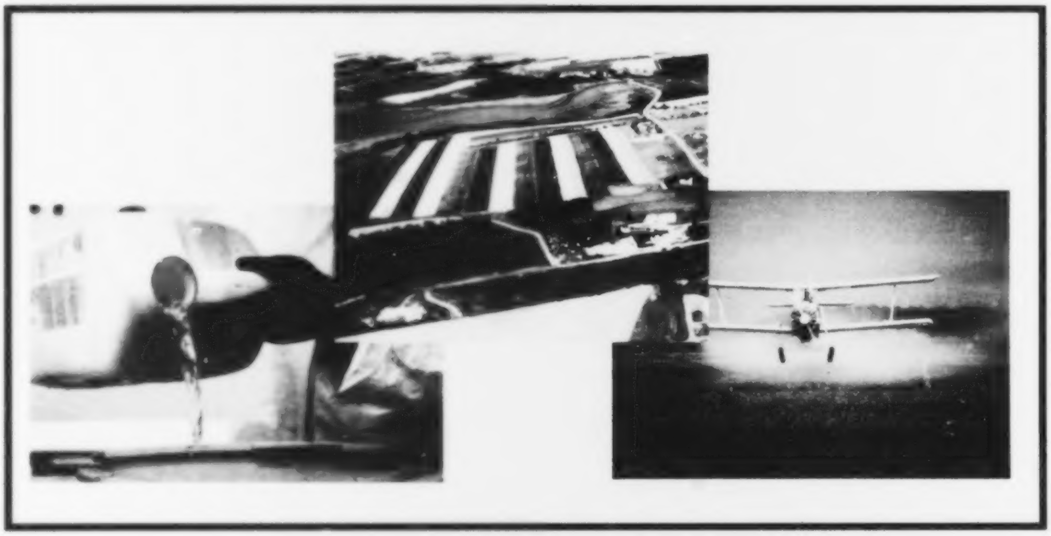
Pesticide Utilization in Canada: A Compilation of Current Sales and Use Data



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Prepared in fulfilment of a requirement of the Environment Canada Pesticide Program Coordinating Committee

Environment Canada Environnement Canada

Canada

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Overview

Environment Canada has recognized the need to compile information regarding the extent of pesticide utilization in Canada. This will aid in developing and filling gaps in monitoring programs, establishing pesticide priorities, and assist environmental managers and regulators in the development of policies, guidelines and standards. As accurate pesticide use data are difficult and expensive to collect, pesticide sales data are often used as a surrogate. This information is an indispensable tool; it is necessary to track pesticide use trends and develop realistic models of the environmental exposure and fate of pesticides. An accurate picture of pesticide inputs across the country is required in order for Canada to truly fulfill its commitments under the *Fisheries Act*, the *Species at Risk Act* and the *Migratory Birds Convention Act*.

Currently, Canada lacks up to date pesticide use and sales data. There are, however, separate ongoing efforts endeavouring to generate this information at both the Pest Management Regulatory Agency (PMRA) and at Agriculture and Agri-Food Canada (AAFC) in conjunction with Statistics Canada. Many of the provinces and territories routinely collect pesticide sales or use data but the approach is not consistent across the country; there are variations in the ways that the provinces collect and present their data, as well as the year(s) for which the data are available. This, in addition to the fact that pesticide use varies greatly across the country, due to differing climate, geography and agricultural undertakings, makes comparing pesticide data from the provinces and territories and reporting on a national basis a difficult task. Most data compiled in this report were obtained from pesticide sales and use reports published by the provinces and territories as well as from primary literature in an attempt to fill data gaps.

This report is being made available to assist a variety of clients: Federal and Provincial/Territorial environmental monitoring and compliance staff to help identify and set monitoring priorities; the CCME to aid in the development of pesticide guidelines; researchers and industry (e.g., CropLife Canada); and the PMRA and Provincial/Territorial regulatory agencies in order to set pesticide priorities, properly assess health and environmental risks of pest control products and ensure that the proper regulatory framework is in place to control currently used pesticides.

Qualifier: This report documents the most current publicly available information from provinces and territories. Many assumptions and estimations were made for the purpose of comparability. The report is not meant to usurp other more comprehensive scientific and/or regulatory efforts of the federal government currently underway. In anticipation of these other outputs, this report is to serve in the interim as a snapshot of the current situation. It is recommended that a user of this report contact the appropriate source of the data for further precisions (see contact information below).

Acronyms

2,4-D	2,4-Dichlorophenoxyacetic acid
4-CPA	4-Chlorophenoxyacetic acid
ACQ	Alkaline copper quaternary
ACZA	Ammoniacal copper zinc arsenate
Alta.	Alberta
AAFC	Agriculture and Agri-Foods Canada
a.i.	Active Ingredient
B.C.	British Colombia
B.t.	*Bacillus thuringiensis*
CCA	Chromated copper arsenate
CCME	Canadian Council of Ministers of the Environment
DDAC	Didecyl Dimethyl Ammonium Chloride
EC	Environment Canada
ELSE	Electronic Labels: Search and Evaluation
EPTC	*S*-ethyl dipropylthiocarbamate
FA	Fisheries Act
GSA	Georgia Strait Alliance
ha.	Hectare
IPBC	Iodocarb
IPM	Integrated Pest Management
MAFRI	Manitoba Agriculture, Food and Rural Initiatives
Man.	Manitoba
MBCA	Migratory Birds Convention Act
MCPA	2-methyl-4-chlorophenoxyacetic acid
MCPB	4-(4-chloro-*o*-tolyloxy)butyric acid
MELP	The British Colombia Ministry of Environment, Land and Parks
MoE	Ministry of the Environment
MWLAP	The British Colombia Ministry of Water, Land And Air Protection
N.B.	New Brunswick
N.L.	Newfoundland and Labrador
N.S.	Nova Scotia
NPE	Nonylphenoxypolyethoxyethanol
N.W.T.	Northwest Territories
OECD	Organisation for Economic Co-operation and Development
Ont.	Ontario
P.E.I.	Prince Edward Island
PMRA	Pest Management Regulatory Agency
Que.	Quebec
Sask.	Saskatchewan
SARA	Species at Risk Act
TCA	Trichloroacetic Acid
Y.T.	The Yukon Territory

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Executive Summary

In Canada, pesticide management is achieved through the combined efforts of a number of federal and provincial government departments. Within the federal government, the Minister of Health is responsible for regulating the use of pesticides through the Pest Management Regulatory Agency (PMRA), which administers the *Pest Control Products Act*. Provincial responsibilities include, but are not limited to, regulating the sale, use, transportation, storage and disposal of pesticides. The provinces also conduct compliance monitoring, and issue licenses and/or permits to pesticide applicators, operators and vendors.

Environment Canada has a commitment to pollution prevention, and a mandate to ensure a reduction of the risks posed by the releases of toxic substances into the environment, in order to protect Canadians from domestic and global sources of pollution, and conserve biodiversity and the ecosystems that support it. The department supports Health Canada by carrying out many pesticide-related activities in co-ordination with the PMRA, including research and monitoring of the presence, fate and effects of pest control products in the environment, and the development of environmental quality guidelines.

Many of Environment Canada's pesticide-related activities would benefit greatly from knowledge of the amounts of pesticides that are used across the country. Pesticide sales data could act as an indicator of pesticide use. This knowledge would improve the efficiency of monitoring programs throughout the country, giving a better representation of what is being released into the environment. Pesticide use data are necessary to the development of risk assessments and standards and guidelines to inform managers on the regional impacts of pesticide use. For Canada to meet its commitments to protect the environment and obligations under legislation such as the *Species at Risk Act* (*SARA*), the *Fisheries Act* (*FA*) and the *Migratory Birds Convention Act* (*MBCA*), it is essential to know the extent of the release of pesticides to our natural environment in order to determine the impacts of pesticide exposure. Pesticide use data can also be used to prioritize research activities on ecosystem impacts within agricultural and forestry landscapes with the ultimate aim of promoting multiple uses of these landscapes in Canada.

Although Canada does not yet have a national system in place to collect and report pesticide sales data, many provinces and territories collect this information on a regular basis. One drawback is that the available data are collected and presented in numerous ways (e.g., the year(s) that data are available for; the frequency of reporting; presentation of the quantity sold/used by active ingredient, chemical grouping or product trade name), making the compilation and comparison of the data across the nation difficult. For example, Ontario and Newfoundland report pesticide use while Alberta, Quebec, New Brunswick and Prince Edward Island (PEI) report sales. British Colombia, the Yukon and the Northwest Territories all report a mixture of sales and use. Manitoba relies on the Manitoba Crop Insurance Corporation who has a database containing the acreage that pesticides were potentially applied to, and Saskatchewan is currently developing a pesticide sales database.

While there are over 7000 pesticide products and over 500 active ingredients registered for use in Canada, many products have the same active ingredient(s), thus when you add these together, high quantities of a particular compound may be found in each province. The herbicide glyphosate was used or sold in the highest quantity, with a total of 4,608,767.47 kg reported. In fact, it is the only active ingredient to be used in every Canadian province and territory. Creosote was used in the second highest quantity (2,163,992.61 kg); this was almost exclusively due to its high usage in British Colombia. Other pesticide active ingredients whose sales are in the top 10 nationwide include MCPA (1,540,427.84 kg), 2,4-D (1,490,050.57 kg), chromated copper arsenate (824,100.00 kg), triallate (708,555.96 kg), mancozeb (665,359.19 kg), ethalfluralin (598,041.49 kg), atrazine (553,369.61 kg) and bromoxynil (544,170.68 kg).

Saskatchewan does not currently collect pesticide sales or use data. As the largest pesticide user is Canada, with 36% of sales, this presents a significant gap in the current knowledge of pesticide utilization. Saskatchewan Agriculture, however, is currently developing a pesticide sales database. Other than Alberta and Quebec, there was not a comprehensive effort to quantify urban pesticide use among any of the provinces/territories. As urban pesticide use is on the rise nationally, and pesticides are being detected in urban water bodies, it is important to account for the amount of pesticide use in urban areas.

Canada should follow the lead of other OECD countries and implement a system to collect pesticide use and sales data at a national level. In the interim, the provinces should continue their collection of pesticide use and sales data in order to fulfill their needs.

Organization of this report

The report is broken down into sixteen sections. Section 1 provides an introduction and an overview of current pesticide utilization in Canada. Sections 2 -14 provide an overview of pesticide use in each province/territory. Each of these sections is further broken down into data collection methods, assumptions, pesticide use and data gaps.

Section 15 presents the general data gaps that were found in this compilation. It was established that there is not a standardized way of reporting pesticide use and sales data among the provinces and territories. The differing formats required the formulation of assumptions and estimations in order to develop a national picture of pesticide use and sales.

Section 16 describes the report's recommendations. Ongoing efforts by the provinces and territories to collect pesticide use and sales data should be maintained. Users of these data should contact data providers directly for further precisions.

The report is accompanied by appendices that give more detail. Throughout the document, for the purpose of brevity, the reader is encouraged to refer to the original data source by consulting the appropriate reference.

Résumé

Au Canada, la responsabilité de la gestion des pesticides est partagée entre un certain nombre de ministères fédéraux et provinciaux. Au fédéral, le ministre de la Santé est chargé de réglementer l'utilisation des pesticides par l'entremise de l'Agence de réglementation de la lutte antiparasitaire (ARLA), qui applique la *Loi sur les produits antiparasitaires*. Les provinces sont entre autres responsables de la réglementation de la vente, de l'utilisation, du transport, de l'entreposage et de l'élimination des pesticides. Elles assurent également la surveillance de la conformité et délivrent des permis aux opérateurs et aux vendeurs.

Environnement Canada a à cœur la prévention de la pollution et a le mandat de réduire les risques que représentent les rejets de substances toxiques dans l'environnement afin de protéger les Canadiens et Canadiennes contre les sources intérieures et planétaires de pollution, et de conserver la biodiversité et les écosystèmes qui la sous-tendent. Le Ministère aide Santé Canada à réaliser de nombreuses activités liées aux pesticides, en collaboration avec l'ARLA, notamment la recherche et la surveillance de la présence, du devenir et des effets des produits antiparasitaires dans l'environnement ainsi que l'élaboration de recommandations pour la qualité de l'environnement.

Si l'on connaissait les quantités de pesticides utilisées à l'échelle du pays, bon nombre des activités connexes réalisées par Environnement Canada en seraient grandement facilitées. Les données sur la vente de pesticides pourraient servir d'indicateurs de leur utilisation. Ces connaissances permettraient d'améliorer l'efficacité des programmes de surveillance canadiens, en donnant une meilleure idée des rejets dans l'environnement. Les données sur l'utilisation des pesticides sont nécessaires à l'élaboration d'évaluations des risques, de normes et de recommandations afin d'informer les gestionnaires des impacts de l'utilisation des pesticides dans leur région. Pour que le Canada puisse respecter son engagement de protéger l'environnement et ses obligations en vertu de la *Loi sur les espèces en péril*, la *Loi sur les pêches* et la *Loi sur la Convention concernant les oiseaux migrateurs*, il est essentiel de connaître l'étendue du rejet des pesticides dans son milieu naturel afin de déterminer les répercussions de l'exposition aux pesticides. Les données sur l'utilisation des pesticides peuvent également servir à prioriser des activités de recherche sur les impacts sur les écosystèmes dans les paysages agricoles et sylvicoles, dans le but ultime de promouvoir des utilisations multiples de ces paysages au Canada.

Le Canada n'est pas encore doté d'un système national de collecte et de communication de données sur la vente de pesticides, mais bon nombre de provinces et de territoires recueillent régulièrement ces renseignements. Il y a toutefois un inconvénient : les données disponibles sont recueillies et présentées de nombreuses façons (p. ex. les années pour lesquelles les données sont disponibles; la fréquence des rapports; la présentation de la quantité vendue/utilisée par ingrédient actif, groupe chimique ou nom commercial du

produit), ce qui rend la compilation et la comparaison des données difficiles à l'échelle du pays. Par exemple, l'Ontario et Terre-Neuve-et-Labrador déclarent l'utilisation des pesticides, alors que l'Alberta, le Québec, le Nouveau-Brunswick et l'Île-du-Prince-Édouard déclarent les ventes. Quant à la Colombie-Britannique, au Yukon et aux Territoires du Nord-Ouest, ils déclarent les ventes et les utilisations. Le Manitoba compte sur la Société d'assurance-récolte du Manitoba, qui a une base de données sur l'aire d'épandage possible des pesticides, et la Saskatchewan met actuellement sur pied une base de données sur la vente de pesticides.

Plus de 7 000 produits antiparasitaires et plus de 500 ingrédients actifs sont homologués au Canada, mais de nombreux produits ont les mêmes ingrédients actifs. Par conséquent, lorsque ces produits sont combinés, on peut trouver de grandes quantités d'un composé particulier dans chaque province. L'herbicide glyphosate a été le plus utilisé ou le plus vendu. En effet, 4 608 767,47 kg ont été déclarés. En fait, c'est le seul ingrédient actif qui est utilisé dans chaque province et territoire canadien. La créosote arrive deuxième (2 163 992,61 kg), presque exclusivement en raison de sa grande utilisation en Colombie-Britannique. Parmi les 10 ingrédients actifs des pesticides les plus vendus au Canada, notons le MCPA (1 540 427,84 kg), le 2,4-D (1 490 050,57 kg), l'arséniate de cuivre chromaté (824 100, 00 kg), le triallate (708 555,96 kg), le mancozèbe (665 359,19 kg), l'éthalfluraline (598 041,49 kg), l'atrazine (576 928,24 kg) et le bromoxynil (544 170,68 kg).

Actuellement, la Saskatchewan ne recueille pas de données sur la vente ou l'utilisation de pesticides. Comme c'est dans cette province canadienne que les pesticides sont les plus utilisés (36 % des ventes), nos connaissances actuelles sur l'utilisation des pesticides accusent de profondes lacunes. Toutefois, le ministère de l'Agriculture de la Saskatchewan met actuellement sur pied une base de données sur la vente de pesticides. Aucun territoire ni aucune province, à part l'Alberta et le Québec, ne quantifient l'utilisation des pesticides en milieu urbain. Comme cette utilisation gagne en popularité à l'échelle du pays et que les pesticides sont présents dans des plans d'eau dans les zones urbaines, il importe de rendre compte de la quantité de pesticides utilisée dans ces milieux.

Le Canada devrait suivre l'exemple d'autres pays de l'OCDE et mettre sur pied un système de collecte de données sur l'utilisation et la vente de pesticides à l'échelle nationale. Entre-temps, les provinces devraient continuer de recueillir ces données afin de répondre à leurs besoins.

Rapport

Le rapport se divise en 16 sections. La section 1 commence par une introduction et donne un aperçu de l'utilisation actuelle des pesticides au Canada. Aux sections de 2 à 14, on donne un aperçu de l'utilisation des pesticides dans chaque province et territoire. Chacune de ces sections compte les subdivisions suivantes : les méthodes de collecte de données, les hypothèses, l'utilisation des pesticides et les lacunes statistiques.

À la section 15, on présente les lacunes statistiques générales qui ont été relevées dans cette compilation. Selon le rapport, les provinces et les territoires n'utilisent pas une méthode normalisée pour déclarer des données sur l'utilisation et la vente de pesticides. Les différentes présentations ont nécessité la formulation d'hypothèses et d'estimations afin de brosser un tableau national de l'utilisation et de la vente de pesticides.

À la section 16, on présente les recommandations. Les provinces et les territoires devraient continuer de tout mettre en œuvre pour recueillir des données sur l'utilisation et la vente de pesticides. Les utilisateurs de ces données devraient communiquer directement avec les fournisseurs de données afin d'obtenir plus de précisions à ce sujet.

Le rapport est accompagné d'annexes qui donnent plus de détails. Tout au long du document, par souci de brièveté, on invite le lecteur à consulter la référence appropriée.

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1.0 Introduction

Synthetic pesticides have been used on a large scale world-wide for over 50 years. By design, pesticides are toxic chemicals intended to eliminate pest species and it is essential to have a good handle on their exposure if we are to reduce any potential environmental risk through sound management and/or regulations. In Canada, there is a lot of uncertainty as to the quantities and distribution of pesticide releases to the environment. In fact, of 22 countries responding to an OECD survey, only Canada and the Slovak republic do not require the reporting of pesticide sales. As such, Canada does not yet possess the capacity to adequately measure the amount of pesticides being used, hindering its ability to properly assess risks to health and the environment.

Pesticide use statistics are an indispensable tool to the efficient use of resources, in the development of pesticide monitoring programs, in regulation and guideline development as well as in the assessment and mitigation of risk to health and the environment. Pesticide sales data are being used as an adequate surrogate to use data as the collection of comprehensive pesticide use data is extremely expensive and time consuming For example, the State of California was once the only jurisdiction in North America to collect comprehensive pesticide use data. In 2002, the State of Oregon followed suit and implemented a system to collect detailed pesticide use information (Neumeister, L., 2002). In Canada, Ontario has been collecting pesticide use data since 1973, although the scope of the survey covers only field crops, fruit and vegetables.

Pesticide use data have been identified as an important tool over the last 25 years. In the late 1970s, the Federal Interdepartmental Committee on Pesticides established the "Use Statistics Committee" in order to compile regional sales statistics for 30 compounds (Government of Canada, 1978 and 1984). This initiative was not sustained, generating a vast disparity in pesticide use knowledge in Canada. In the late 1980s and early 1990s, pesticide use was surveyed by Environment Canada's Pesticide Division and efforts were dropped upon the creation of the PMRA in 1995. In 1997, the National Pesticide Sales Database Working Group, a working group of the Federal/Provincial/Territorial Committee of Pest Management and Pesticides was initiated in order to develop an approach to collect annual pesticide sales data from all registrants in all provinces and territories (PMRA, 2003). For more information on this activity, please refer to the PMRA website at www.pmra-arla.gc.ca/english/fpt/npsdwg-e.html. As well, AAFC and Statistics Canada are developing a crop protection survey to be conducted in 2006 that will measure the types and quantities of crop protection chemicals used, application methods and the training received by applicators.

It is intended that these two government efforts will in the future be the primary source of pesticide use and sales information.

1.1 Limitations of Using Sales Data

Pesticide sales data are considered to be a good indicator of pesticide use. This is a reasonably good assumption for the agricultural sector as financial constraints prevent stockpiling of products. This assumption, however, falls short when applied to the domestic sector as domestic products are shipped by case lots. Therefore, unless records are obtained from point of sale, only case lot quantities are recorded and not actual sales. (Byrtus, G., 2000).

Nonetheless, there are many assumptions that have to be made when substituting sales data for pesticide use data. It is assumed that:

- pesticides will be used within the year of purchase;
- inventory carryover from one year to another will be reported. This, however, is typically not accounted for;
- a product sold in one sector of use will be used in that particular sector. For example, a product bought from an agricultural supply vendor may be used for landscaping. This sale will be reported as an agricultural use: overvaluing agricultural use of pesticides and under representing landscaping in the sales data;
- the pesticides purchased in a province are used within the province. Provincial pesticide sales databases can not take into account pesticides that are purchased out of province or that are sold in province and shipped out. This assumption falls short for areas along provincial/territorial borders. It should be noted that many of the pesticides used in the Territories are purchased in the Provinces (B.C., Alta., and Ont.).

Clearly, pesticide sales data can not provide all the information that pesticide use data would. Sales data can not account for the area of land that the pesticide will be applied to, hence making it difficult to accurately calculate the intensity of pesticide use. Short of environmental monitoring, neither sales data nor use data can accurately predict the presence or effects of a pesticide in the environment as there is a multitude of factors that control the distribution and fate of pesticides in the environment (persistence, water solubility, volatility, climate, soil type, aquatic environments, etc.). In spite of this, it is supposed that the higher the sales and use of a pesticide, the more likely it is that the pesticide will be present in the environment. However, as each pesticide presents different levels and types of toxicity on living organisms, it is difficult to generalize the environmental impact of a pesticide strictly by the quantity of its use.

1.2 Overview of Pesticide Sales in Canada

Due to Canada's large land mass, varied climate, soils and crops, pesticide use differs greatly across the country. Pesticide application is highly dependent on crop type, as the frequency of insect infestation and disease differs between crops. Generally, cereal crops require a lower intensity of pesticide use (kg a.i.

/ha) than do fruit and vegetable crops. When compared to other countries, Canada's average intensity of pesticide use of 0.9 kg a.i./ha is low. This is in part due to a short growing season allowing for only one or two crops to be grown per season, the type of crops grown (e.g., cereal crops) and less intensive agricultural processes (Alberta Environment, 2001). Table 1 compares Canada's total use of pesticides and intensity of use in 1988 to those of five other countries.

Table 1: 1988 agricultural use of pesticides by country (Alberta Environment, 2001; Fredricksen, L. *et al.*, 2002).

Country	**Total use (kg a.i.)**	**Intensity of use (kg a.i./ha)**
Japan	82,553,000	7.7
United Kingdom	40,774,000	5.8
France	31,487,000	4.4
West Germany	85,386,000	4.2
United States	341,669,000	1.8
Canada	***41,684,000***	***0.9***

It should be noted, however, that Canada's agricultural pesticide use varies greatly across the country. Provinces with large areas of land dedicated to field crops generally require less pesticide use per hectare than do provinces with high fruit, vegetable and potato production. As such, Alberta and Manitoba have low pesticide use intensities while that of P.E.I. is high (Table 2).

Table 2: Intensity of agricultural pesticide use in selected provinces

Province	**B.C.***	**Alta.**	**Man.**	**Ont.**	**Que.**	**P.E.I.**
Intensity of use (kg a.i./ha)	1.80	0.79	0.41	1.09	2.46	4.87
Year	1999	1998	2003	2003	2001	2003

*Area of farmland based on Statistics Canada, 2001.

Worldwide, Canada represents approximately 3% of pesticide sales. The majority of Canada's pesticide sales occur in the Western Provinces: 36% in Saskatchewan; 24% in Alberta and British Columbia; Manitoba 18%; Ontario 16%; Quebec 4%; and the remaining 2% split between the Atlantic Provinces and the Territories (Gorse, 2005; Crop Life Canada, 2004a).

According to the Standing Committee on Environment and Sustainable Development (2000), roughly 91% of the pesticides in Canada are purchased by the agricultural sector. Of the remaining portion (9%), the domestic sector is responsible for 57% of sales; turf and ornamental comprise 16%; the forestry sector and industrial sectors comprise approximately 10% each and specialty products and other uses make up the remainder (Figure 1).

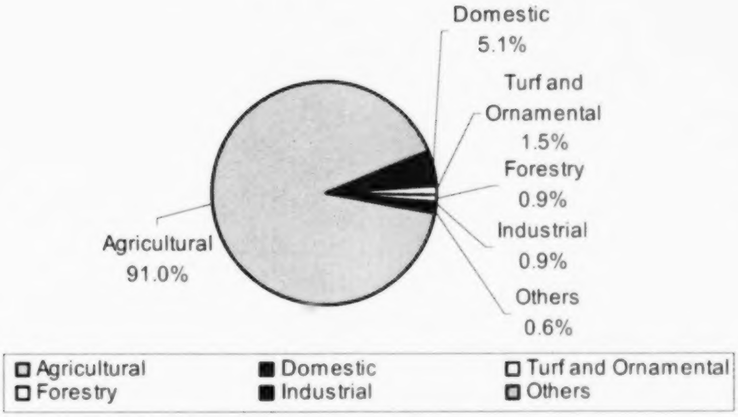

Figure 1: Pesticide use by sector in Canada

In 2003, herbicides accounted for 77% of total pesticide sales in Canada; fungicides represented 9%, insecticides 8% and specialty products 6% (Figure 2). This resulted in $1.31 billion in sales for the crop protection products industry, representing a 3% increase from 2002. Overall, however, this amount is down from 1997, when sales totalled $1,429,887,000 (Croplife Canada, 2004b).

Furthermore, many provinces have been experiencing decreases in pesticide sales over the years. Reasons for these reductions include:

- the introduction of more selective pesticides that are applied in lower quantities (g/ha as opposed to kg/ha);
- the implementation of integrated pest management (IPM): the use of a variety of biological, physical and chemical methods to control a specific pest while having the least impact possible on the environment and non-target species;
- the substitution of crops that are pesticide intensive for those that require low pesticide intensity;

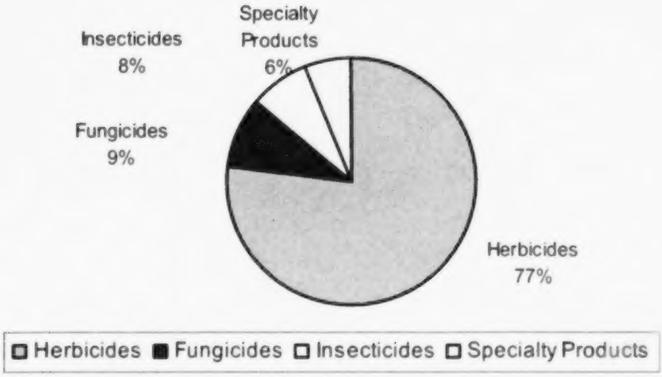

Figure 2: Breakdown of pesticide use in Canada in 2002 by type

There are over 7000 pesticide products registered for use in Canada; however, many of these contain the same active ingredient(s). As such, the same compound may be used in high quantities in each province. The most widely used pesticide in Canada is the herbicide glyphosate. With 4,608,767.47 kg of sales or use, it is used in every Canadian province and territory that collects data (Figure 3). Creosote was used in the second highest quantity (2,163,992.61 kg); this was almost exclusively due to its high usage in British Colombia. Other pesticide active ingredients whose sales are in the top 10 nationwide include MCPA (1,540,427.84 kg), 2,4-D (1,490,050.57 kg), chromated copper arsenate (824,100.00 kg), triallate (708,555.96 kg), mancozeb (665,359.19 kg), ethalfluralin (598,041.49 kg), atrazine (553,369.61 kg) and bromoxynil (544,170.68 kg). The quantities (in kg) of the top 20 pesticides sold/used in Canada are shown in Table 3.

Table 3: Sales/use of the top 20 pesticide active ingredients (in kg) in Canada.

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001) *	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Glyphosate	H	126,269.00	2,682,748.86	479,726.13	1,170,762	1	122,609.33	17,218.70	8,999	428.83	4.53	1.09	4,608,767.47	11
Creosote	AM	2,163,142.00	805.16								45.46		2,163,992.61	3
MCPA	H	23,598.00	885,239.13	450,091.49	129,337		17,053.95	6,109.27	28,999				1,540,427.84	7
2,4-D	H	18,543.00	765,820.39	609,004.71	87,261	7	3,083.51	4,633.37		2182.67	24.20	0.43	1,490,553.27	10
CCA	AM	824,100.00											824,100.00	1
Triallate	H	2,248.00	693,178.48	12,129.48									707,555.96	3
Mancozeb	F	34,888.00	45,813.94	70,231.05	64,647	6	383,277.97	6,501.24	50,000				655,359.19	8
Ethalfluralin	H	1,546.00	452,294.41	144,201.08									598,041.49	3
Atrazine + related active triazines	H	11,535.00	5,753.81	7,852.87	513,950	2	3,530.69	6,247.75	4,499.50				553,369.61	8
Bromoxynil	H	2,990.00	268,105.29	191,936.39	80,871		57.40	210.60					544,170.68	6
Surfactant Blend	A	7,498.00	496,561.74				852.93	653.75					505,566.42	4
Mineral Oil	A/G/H/I	340,683.00	3,477.36			3 (I), 15(A), 18 (H)	9,271.80	41,212.68		19.78	1.05		394,665.67	6
Petroleum Hydrocarbon Blend	A	7,232.00	368,704.26										375,936.26	2
Dicamba	H	3,627.00	138,278.65	15,899.63	195,627	11	1,562.22	1,042.53		89.25	3.96	0.38	356,130.62	10
Trifluralin	H	3,408.00	230,028.22	65,382.51	16,889		910.14	478.67					317,096.54	6
s-metolachlor	H	3,892.00			286,923	4		2,849.76					293,664.76	4
Chlorothalonil	F	33,505.00	37,333.96	30,710.87	38,570	12	64,367.11	10,502.90	50,000	76.00			265,065.84	9

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Metolachlor	H	29.90	4,297.85		255,705		289.80	1,514.55					**261,837.10**	5
Chlorpyrifos	I	4,561.00	217,397.54	20,854.47	5,366		2,749.32	1,715.06		4.32	0.65	0.72	**252,649.07**	9
Mecoprop	H	4,417.00	27,264.09	8,657.53	703	19	1,237.66	206,604.75		567.81	20.06	2035.20	**251,507.11**	10

Data for Saskatchewan are not available.

*Due to Quebec's reporting format, its data are not comparable to those of the other provinces. As such, only the ranks for the top 20 pesticides sold in the province in 2001 are presented. (See section 7.2 for explanations of Quebec's data presentation).

**MCPA values include MCPB

[1] The number of provinces who reported use of the pesticide.

Legend

A = Adjuvant/surfactant	AM = Anti-microbial	F = Fungicide	G = Growth Regulator	H = Herbicide
I = Insecticide				

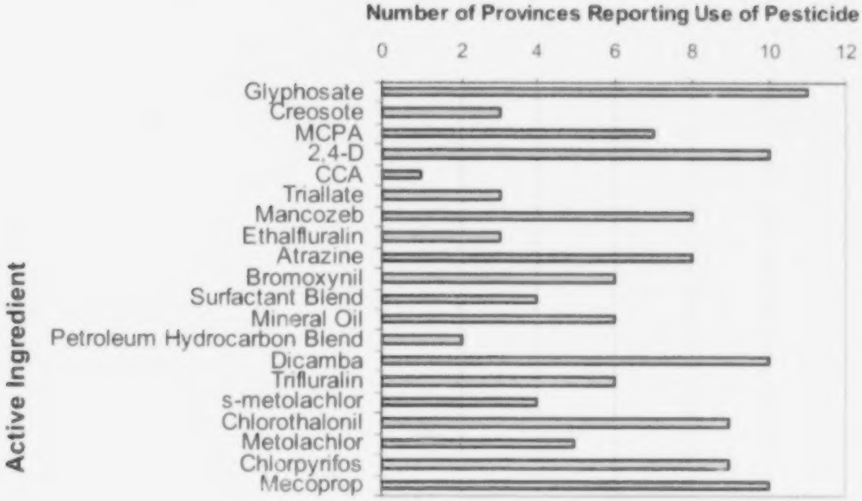

Figure 3: Number of provinces/territories that use top 20 pesticides.
Saskatchewan data is not available and only top 20 pesticides in Quebec were included.

1.2.1 Pesticide Use in the Domestic Sector

Urban pesticide use has been on the rise nationally (Verrin, S.M., *et al.*, 2004). As with other household products (e.g. paints, detergents, petroleum products), the lack of training or certification for their use, may contribute to increases in the likelihood of their improper use (i.e. disposal) and sometimes higher application rates than those stated on the label. For example, diazinon and 2,4-D have been detected in Ontario's urban ponds, streams and the Humber and Don Rivers. Occasionally, the levels of these pesticides in Ontario's surface waters exceed limits set to protect aquatic life (Toronto Public Health, 2002; Struger, J., 2005). Although the total quantities (kg) of pesticides being applied in the domestic sector are much lower than those of the agricultural sector, the intensity of pesticide use, measured in kg a.i./ha, tends to exceed that of the agricultural sector. In 1998, urban pesticide use for the City of Calgary was 2.92 kg a.i./ha. Assuming that pesticide application does not vary greatly from city to city, urban pesticide use in Canada is 0.97 to 3.65 times higher than agricultural use (Pim, L., *et al.*, 2002). Thus it is important to account for the amount of pesticide used in urban areas.

Although there are hundreds of pesticides on the market for domestic use, 11 active ingredients constitute the most frequently used: the herbicides 2,4-D, dicamba, mecoprop, MCPA and glyphosate; the insecticides malathion and carbaryl; and the fungicides chlorothalonil, benomyl, quintozene and bendiocarb.

2.0 British Columbia

2.1 Data Collection Methods

British Colombia pesticide sales data used in this report are from ENKON Environmental Limited (2005).

Environment Canada and the Ministry of Environment, Land and Parks (MELP) (now the Ministry of Environment (MoE)), have undertaken four surveys of pesticide sales and use data in 1991, 1995, 1999 and 2003. The latest report includes pesticide sales records for 2003, including veterinary and commercial pesticides, wood preservatives and anti-sapstain chemicals. For a regional breakdown of pesticide use in British Colombia, see ENKON Environmental Limited (2001).

Data for the report were collected from the following sources:

- annual reports filed by vendors who are required to maintain a register tracking the sales of pesticide products (product and quantity), as well as the purchasers of Reportable pesticides (with Restricted or Commercial use labels);
- annual pesticide use summaries reported by licensed pest control services who must keep daily records of pesticide use;
- MoE's Pesticide Use Permits for the aquaculture industry;
- surveys of pesticide users including wood preservatives, anti-sapstain chemicals, golf courses and domestic flea products sold through veterinariens.

2.2 Assumptions

- If the guarantee for products sold as solids is given as a percent, the number of kilograms of a.i. was calculated directly using the appropriate multiplication. (i.e. If 500 kg of Sinbar (80% terbacil) are sold, then (500*0.8) 400kg of terbacil were sold.);
- If the guarantee for a liquid product is given in grams per litre (g/L) for liquid products, the number of kilograms of a.i. was calculated directly using the appropriate multiplication. (e.g. If 411 L of Round-up (356 g/L glyphosate) were sold, (411 L*356 g/L /1000g) 146.32 kg of glyphosate were sold;
- Some products sold as liquids have the guarantee given as percent (e.g. Sevin Brand XLR Plus Carbaryl Insecticide, 42.8%). For these products one litre was assumed to equal one kilogram, consistent with MELP's standards for reporting pesticide use under permit requirements;
- Products, such as B.t., have the percent guarantee reported in non-standard units. B.t. is measured in bioactive units (btu or itu) per litre or per kilogram. For pesticide permit reporting, B.t. is reported as total litres

or kilograms applied without calculation of the active agent, in accordance with MELP's suggestions;

- The other major products for which the percent guarantee is reported in non-standard units are certain fumigants. For products such as Plant-Fume, the guarantee is reported as grams or percent in smoke. The quantity of these products sold was also considered equivalent to the active ingredient. (ENKON Environmental Limited, 2001);
- Percentages may not add up to 100% due to rounding.

2.3 Pesticide Use in British Columbia

In 2003, 4,666,709.00 kg of pesticide active ingredients were purchased or used in British Columbia. Of this, 71.67% were anti-microbial chemicals (predominantly wood preservatives and anti-sapstain chemicals), 8.76% were insecticides, 6.53% were fungicides, 6.14% were herbicides. The remaining 6.91% included fumigants, growth regulators, soil fumigants, molluscicides, vertebrate control products, adjuvants and surfactants (Figure 4, Table 4).

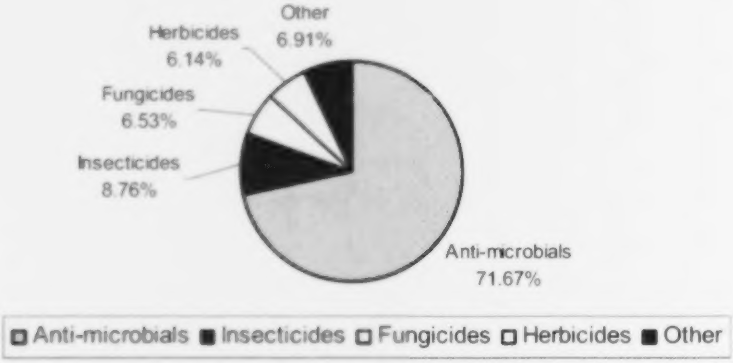

Figure 4: 2003 pesticide use in British Colombia by type.

Table 4: 2003 pesticide use in British Columbia by type

Pesticide Type	Quantity Sold (kg a.i.)	Proportion (%)
Anti-microbials	3,344,531	71.67
Insecticides	408,662	8.76
Fungicides	304,682	6.53
Herbicides	286,423	6.14
Other	322,411	6.91
TOTAL	**4,666,709**	**100.01**

*Percentages may not add up to 100% due to rounding.

Of the 287 active ingredients registered for use in British Columbia in 2003, 20 accounted for 93% of the pesticides sold or used (ENKON Environmental Limited, 2005) (Table 5). A large proportion of these were anti-microbial products used for wood preservation. When excluding the anti-microbial products to obtain products used in the agriculture sector, 10 active ingredients comprise 63% of those sold. These were insecticidal and herbicidal mineral oils; glyphosate (herbicide); sulphur, mancozeb, chlorothalonil and captan (fungicides); the insecticides diazinon and B.t. and the fumigants metam and methyl bromide.

Table 5: Top 20 pesticide active ingredients sold or used in B.C. in 2003, excluding domestic use. Top 10 are listed in **bold**.

Active Ingredient	Pesticide Type	Quantity Sold/Used (kg)	Proportion (%)
Creosote	**Anti-microbial**	**2,163,142.00**	**46.35**
CCA	**Anti-microbial**	**824,100.00**	**17.66**
Mineral Oil	**Insecticidal or adjuvant**	**317,108.00**	**6.80**
Didecyl Dimethyl Ammonium Chloride	**Anti-microbial**	**174,635.00**	**3.74**
Pentachlorophenol	**Anti-microbial**	**147,684.00**	**3.16**
Glyphosate	**Herbicide**	**126,269.00**	**2.71**
B.t. Berliner ssp kurstaki	**Insecticide**	**85,765.00**	**1.84**
ACQ	**Anti-microbial**	**74,448.00**	**1.60**
Sulphur	**Fungicide**	**73,408.00**	**1.57**
Disodium Octaborate Tetrahydrate	Anti-microbial	40,281.00	0.86
B.t. Serotype H-14	Insecticide	39,153.00	0.84
Mancozeb	Fungicide	34,888.00	0.75
Chlorothalonil	Fungicide	33,505.00	0.72
Metam	Fumigant	28,582.00	0.61
Diazinon	Insecticide	27,074.00	0.58
Captan	Fungicide	25,500.00	0.55
MCPA	Herbicide	23,598.00	0.51
Mineral Oil	Herbicide	23,575.00	0.51
Formaldehyde	Anti-microbial	21,822.00	0.47
Lime Sulphur	Fungicide	20,524.00	0.44

2.3.1 Pesticide sales trends in B.C

Between 1991 and 2003, there was a 24% increase in total sales of reportable pesticides (Restricted or Commercial use label – including those used in agriculture, forestry and industry). See Appendix 3 for complete listing of pesticides sold or used in B.C.

There are four active ingredients that have remained within the top five reportable pesticides sold since the surveys commenced: mineral oil (insecticidal or adjuvant), glyphosate (herbicide), sulphur (fungicide) and mancozeb (fungicide).

In British Colombia, it is not the agricultural sector that dominates pesticide use, but the forestry industry. Anti-microbials, mainly wood preservatives and anti-sapstains represent 71.67% of pesticide use in the province. In fact, creosote alone accounts for 46.34% of all use. However, as the wood treated with these chemicals is shipped worldwide, the numbers do not necessarily represent what is present in the B.C. environment.

2.4 Data Gaps

There are limited data available for pesticide use in the domestic sector as vendors are not required to report sales.

Additionally, complete pesticide sales data are not available for the entire Pacific Region; much of the information is limited to the Lower Mainland Region.

3.0 Alberta

3.1 Data Collection Methods

Pesticide sales data used in this report are from Byrtus, G. (2000).

Alberta Environment has collected pesticide sales data since 1988 and released their most recent report in 1998. Pesticide sales data were requested from pesticide vendors and wholesalers in Alberta resulting in a compliance rate of 97.0%. The report breaks the pesticide sales data down into the following categories: sector of use, types of use, chemical and resistance groupings and geographic breakdown.

3.1.1 Data Limitations:

- Sales of insecticide and fungicide treated seeds are not included in the survey. However, seed treatment facilities that purchased their pesticides in Alberta are covered in the survey;
- There is little data available for the sales of anti-microbial, disinfectant and wood preservation products as vendor registration is not required for the sales of these products;
- Pet care products and lawn and garden care products shipped into Alberta from small out-of-province distributors were not included in the survey;
- Due to modifications made to the 1998 survey to make it more comprehensive, the data are not directly comparable to the data collected for 1993. The 1993 survey analysed pesticide sales of major line companies, accounting for approximately 50-60% of agricultural sales. The 1998 survey was modified to include vendors of agricultural, domestic, livestock, commercial and industrial and structural pest control products.

3.2 Assumptions

- Products sold are used in the year of sale;

- Domestic products shipped to vendors were sold in 1998 and not carried over into the next year;
- Specific gravity of all pesticides was assumed to be 1.0;
- Biological pesticides, such as B.t., will be reported assuming 100% active ingredient.

3.3 Pesticide Use in Alberta

In 1998, 9,300,507.58 kg a.i. were sold or shipped into the province of Alberta. Of the pesticides sold, 76.38% were herbicides, 13.45% were adjuvants and surfactants, 5.42% were insecticides, 3.43% were fungicides, 0.87% was anti-microbials, anti-microbials, fumigants, mineral oils, molluscicides, repellents (other group), 0.38% was rodenticides and 0.06% was growth regulators (Figure 5, Table 6).

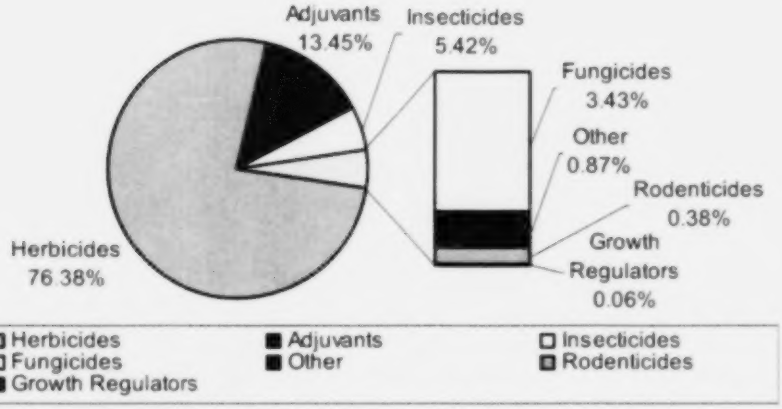

Figure 5: 1998 pesticide sales in Alberta by type of use

Table 6: 1998 pesticide sales in Alberta by type

Pesticide Type	**Quantity Sold (kg a.i.)**	**Proportion of Sales (%)**
Herbicides	7,103,836.56	76.38
Adjuvants	1,251,179.49	13.45
Insecticides	504,280.12	5.42
Fungicides	319,071.67	3.43
Other*	80,942.06	0.87
Rodenticides	35,757.11	0.38
Growth Regulators	5,440.57	0.06
TOTAL	**9,300,507.58**	**100.00**

*As the scope of the 1998 survey did not focus on pesticides included in the "Other" category (i.e. namely wood preservatives, anti-microbials and slimicides) very little information is available for this grouping.

Herbicides are applied in the greatest quantities in Alberta; 7 of the top ten pesticides used in 1998 were herbicides, the remaining pesticides consisted of 2 adjuvants and 1 insecticide. Glyphosate is by far the most used, with 2,682,748.86 kg sold in 1998. Comparatively, the quantities sold of the 9 remaining pesticides in the top 10 were an order of magnitude less than glyphosate (Table 7). The other top 10 pesticides in Alberta were MCPA, 2,4-D, triallate, surfactant blend, ethalfluralin, petroleum hydrocarbon blend, bromoxynil, trifluralin and chlorpyrifos.

Table 7: Top 20 pesticides used in Alberta in 1998.
The top 10 are in **bold**.

Active Ingredient	Pesticide Type	Quantity Sold (kg)	Proportion (%)
Glyphosate	**Herbicide**	**2,682,748.86**	**28.85**
MCPA	**Herbicide**	**885,239.13**	**9.52**
2,4-D	**Herbicide**	**765,820.39**	**8.23**
Triallate	**Herbicide**	**693,178.48**	**7.45**
Surfactant Blend	**Adjuvant**	**496,561.74**	**5.34**
Ethalfluralin	**Herbicide**	**452,294.41**	**4.86**
Petroleum Hydrocarbon Blend	**Adjuvant**	**368,704.26**	**3.96**
Bromoxynil	**Herbicide**	**268,105.29**	**2.88**
Trifluralin	**Herbicide**	**230,028.22**	**2.47**
Chlorpyrifos	**Insecticide**	**217,397.54**	**2.34**
Paraffin Base Mineral Oil	Adjuvant	193,162.56	2.08
Imazamethabenz	Herbicide	173,679.21	1.87
Dicamba	Herbicide	138,278.65	1.49
Tralkoxydim	Herbicide	126,323.46	1.36
Carbathiin	Fungicide	122,292.00	1.31
Nonylphenoxypolyethoxyethanol	Adjuvant	94,247.33	1.01
Paraffin Base Petroleum Oil	Adjuvant	77,427.17	0.83
Ammonium Sulphate		71,104.45	0.76
Glufosinate Ammonium	Herbicide	63,863.79	0.69
Fenoxaprop-p-ethyl	Herbicide	59,919.01	0.64

3.3.1 Pesticide Sales by Sector

The agricultural sector utilized 95.8% of the pesticides in the province; 76.9 % of which were herbicides, 14.9% were adjuvants, 4.7% insecticides, 3.5% were fungicides. The insecticide sales volume was relatively high for Alberta in 1998, due to an outbreak of Lygus bug.

The Commercial and Industrial sectors accounted for 3.3% of pesticide sales, with herbicides representing 75.0% of sales, followed by insecticides with 15.1% due to the use of B.t. for mosquito control programs and forest pest management, fungicides represented 8.7% of sales due to sales to the golf course industry. The remaining 1.2% is attributable to sales of vertebrate pesticides, adjuvants and others.

The Domestic sector accounted for 0.8% of total pesticide sales, with herbicides making up 61.2%, insecticides 31.8%, fungicides 5.3%, and 'others' making up the remainder (Figure 6, Table 8). The livestock and structural sectors accounted for 0.1% of the sales.

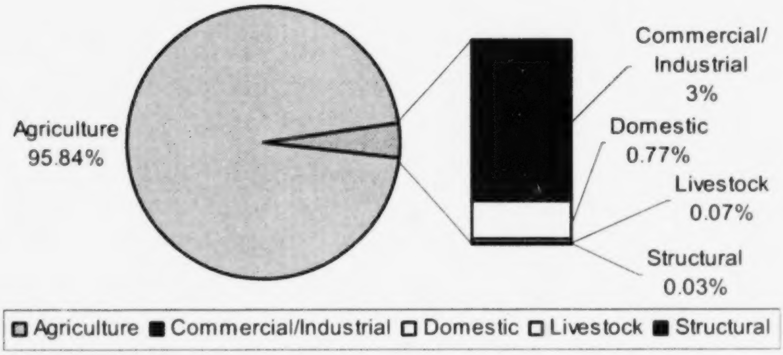

Figure 6: 1998 pesticide sales in Alberta by sector

Table 8: 1998 pesticide sales by sector in Alberta

Sector	**Quantity of sales (kg a.i.)**	**Proportion (%)**
Agriculture	8,913,981.70	95.80
Commercial/Industrial	304,881.60	3.30
Domestic	72,024.40	0.80
Livestock	6,373.20	0.10
Structural	3,236.80	0.00
TOTAL	**9,300,497.70**	**100.00**

Clearly, the agricultural sector utilizes the greatest amount of pesticides with sales of 8,913,981.70 kg. However, when taking into account the area of land to which they are applied, the intensity of use is only 0.79 kg a.i./ha. Conversely, the domestic sector employs pesticides at a rate of 3.1 kg a.i./ha. Even though its total usage is much lower than that of the agricultural sector, the high application intensity elevates the risk of runoff, increasing the potential for detrimental effects on the surrounding environment. This demonstrates the need to survey domestic pesticide use.

3.4 Data Gaps

There are no significant data gaps for Alberta.

4.0 Saskatchewan

4.1 Data Collection Methods

Saskatchewan is currently in the process of developing a database for pesticide sales data (Wilk, C., 2005). As sales data are not available, primary literature was referenced in order to determine the primary pesticides used in Saskatchewan.

4.2 Pesticide Use in Saskatchewan

Pesticide sales in Saskatchewan are declining, particularly in herbicides due to conversion of farms to forage crops (Fredricksen, L., *et al.*, 2002). The 2001 Census of Agriculture shows that since 1996, herbicide and fungicide use has increased while insecticide use has decreased (Figure 7, Table 9)

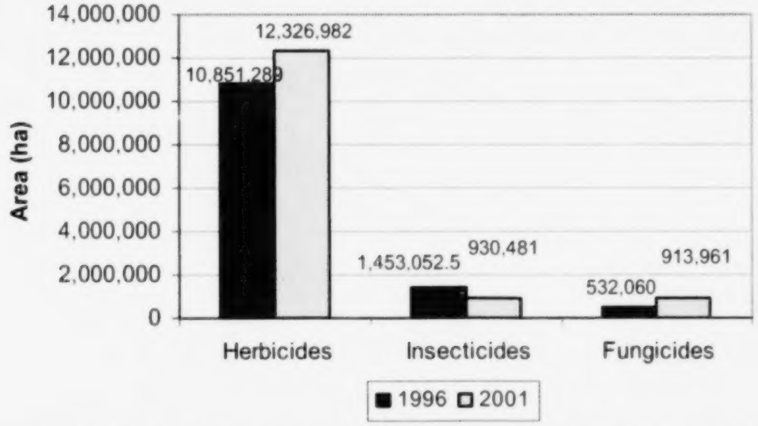

Figure 7: Area of land treated with pesticides in Saskatchewan in 1996 and 2001 (Saskatchewan Agriculture, Food and Rural Initiatives, 2001).

Table 9: Area of land treated with pesticides in Saskatchewan in 1996 and 2001 (Saskatchewan Agriculture, Food and Rural Initiatives, 2001).

	Hectares Treated	
	1996	**2001**
Herbicides	10,851,289	12,326,982
Insecticides	1,453,052.5	930,481
Fungicides	532,060	913,961

In 2000, there were 118 herbicides, 54 fungicides and 38 insecticides registered for use in Saskatchewan (Hall, A., 2005). Herbicides were applied to over 12 million hectares of land in 2001 (Table 9). According to Waite *et al.* (1995), six herbicides represent approximately 80% of herbicide use in Saskatchewan: 2,4-D, bromoxynil, dicamba, diclofop, triallate and trifluralin. These herbicides are also present on a list of the most frequently used pesticides in Saskatchewan by Donald, D. *et al.* (1999), based on a survey of pesticide container collection depots near study regions. Additional pesticides that frequently appear in the literature for Saskatchewan are MCPA, imazamethabenz and glyphosate.

Insecticide use, while generally lower than herbicide use, can increase significantly during periods of infestations. For instance, in 1985 and 1986, a grasshopper infestation led to the treatment of 3-4 million hectares of Saskatchewan farmland with the insecticides carbofuran, deltamethrin, dimethoate and chlorpyrifos at rates of 1kg/ha (Waite D.T. *et al.*, 1995).

4.3 Data Gaps

Saskatchewan represents a substantial data gap in the collection of pesticide sales/use data nationwide. As the largest pesticide user in Canada, Saskatchewan is responsible for approximately 36% of all pesticide sales in Canada (CropLife Canada, 2004a). Therefore, sales data for Saskatchewan are essential to gaining insight into pesticide use in Canada.

Primary literature does not serve as a substitute for sales data as it is impossible to determine the total quantities of pesticides that have been used in the province based on small scale and regional studies. As the quantities reported in the literature are not comprehensive, they can only serve as an indication of what is being used.

5.0 Manitoba

5.1 Data Collection Methods

Manitoba Agriculture, Foods and Rural Initiatives does not collect pesticide sales or use data. However, the Manitoba Crop Insurance Corporation has compiled a database of the crop information reported by producers from 2001 to 2003, but the accuracy of what has been reported has not been verified. The search function allows the user to search by municipality, risk area and crop type. The search is further broken down into pesticide type with the results being displayed by product group or product name.

5.2 Assumptions

The information presented in the database may be an overestimation of use as farmers report only the acreage of their land and that a pesticide was used, not the quantity or the proportion of land that it was applied to. Also, multiple pesticide applications are not taken into account. As such, in order to calculate the quantities of pesticide active ingredients used, the following steps were taken:

- A search of product labels was undertaken (available on the PMRA's ELSE Label Search), in order to determine the active ingredient guarantees for the products as well as the application rates;
- When more than one application rate existed (for different crops or soil types), the average of all the rates was taken (i.e., application rate of 1.0 – 1.5 kg/ha, the rate retained was 1.25 kg/ha);
- The rate of application for each active ingredient in the product was then calculated:

    - For solids, where the guarantee is given in percent, by multiplying the application rate of the product by the percent guarantee for the active ingredient.
        - i.e. for a product with an application rate of 1.0 kg/ha containing an active ingredient with a percent guarantee of 41%, the active ingredient would have an application rate of 0.41 kg/ha.
    - For products where the application rates are given in L/ha and the guarantee is given in g/L, the guarantee for each active ingredient was multiplied by the application rate.
        - i.e. Assert has an application rate of 1.50 L/ha. Its active ingredient, imazamethabenz, has a guarantee of 300 g/L. As such its application rate is (1.5 L/ha * 300 g/L/1000 g) 0.45 kg/L.

- The acreage of land that a product was applied to was converted into hectares by multiplying by 0.405;
- For each product used, the quantities of active ingredients applied were calculated by multiplying the application rates (kg/ha) by the area of land that it was applied to (ha) in order to obtain kg.
    - i.e. Imazamethabenz, with an application rate of 0.45 kg/ha, was potentially applied to 140,886.00 ha of land. As such, the total quantity of imazamethabenz applied was (0.45 kg/ha * 140,886.00 ha) 63,708.65 kg a.i.

5.3 Pesticide Use in Manitoba

Pesticide purchases in 2002 decreased to $201.4 million, down 8.2% from 2001 (Manitoba Agriculture, Food and Rural Initiatives, 2003).

Herbicides were the most frequently used pesticides in Manitoba, representing 84.93% of the province's pesticide use (Table 10, Figure 8). Insecticides and fungicides each account for less than 10% of use. 2,4-D is used in the highest quantity (609,004.71 kg) followed by glyphosate (479,726.13 kg), MCPA/MCPB (446,937.17 kg), bromoxynil (144,201.08 kg), ethalfluralin (144,201.08 kg), glufosinate ammonium (124,972.38 kg), iprodione (65,382.51 kg), bentazon (81,837.41 kg), mancozeb (70,231.05 kg) and trifluralin (65,382.51 kg) (Table 11).

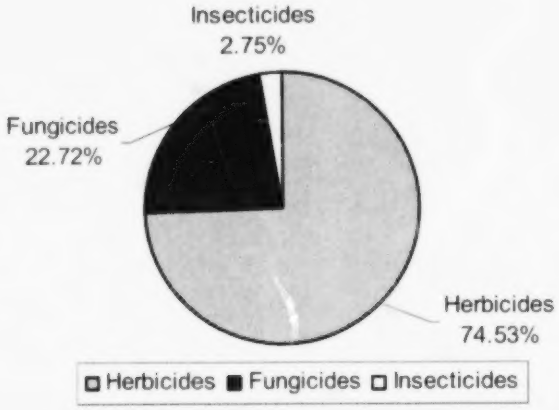

Figure 8: 2003 pesticide use by type in Manitoba.

Table 10: 2003 pesticide use by type in Manitoba.

Pesticide Type	Quantity (kg a.i.)	Proportion of Use (%)
Herbicides	2,645,341.32	86.64
Fungicides	806,611.80	10.16
Insecticides	97,518.22	3.19
TOTAL	**407,591.37**	**100.00**

Table 11: Quantities of the top 20 pesticide active ingredients used in Manitoba in 2003 (Manitoba Crop Insurance Corporation, 2003). Top 10 are listed in **bold**.

Pesticide	Type	Quantity Used (kg a.i.)	Proportion (%)
2,4-D	Herbicide	609,004.71	19.79
Glyphosate	Herbicide	479,726.13	15.59
MCPA/MCPB	Herbicide	446,937.17	14.53
Bromoxynil	Herbicide	191,936.39	6.24
Ethalfluralin	Herbicide	144,201.08	4.69
Glufosinate ammonium	Herbicide	124,972.38	4.06
Iprodione	Fungicide	112,603.34	3.66
Bentazon	Herbicide	81,837.41	2.66
Mancozeb	Fungicide	70,231.05	2.28
Trifluralin	Herbicide	65,382.51	2.13
Imazamethabenz	Herbicide	63,708.65	2.07
Vinclozin	Herbicide	62,763.89	2.04
Dichlorprop	Herbicide	60,759.30	1.97
Carbaryl	Insecticide	49,295.51	1.60
Propiconazole	Fungicide	46,164.89	1.50
Fenoxaprop-p-ethy	Herbicide	38,899.91	1.26
Chlorothalonil	Fungicide	30,710.87	1.00
Sethoxydim	Herbicide	28,158.54	0.92
Clodinafop-propargyl	Herbicide	25,868.48	0.84

Pesticide	Type	Quantity Used (kg a.i.)	Proportion (%)
Tebuconazole	Fungicide	24,900.88	0.82

* Quantities may be overestimated (See Appendix 1 for assumptions). See Appendix 6 listing of pesticide products used in Manitoba in 2003.

The intensity of pesticide use in Manitoba is low. With 3,053,082.30 kg of pesticide active ingredients applied to 7,426,623.88 ha of land in 2003, its intensity of use is 0.41 kg a.i./ha. *Note: as Manitoba's pesticide use is likely overestimated, the intensity of pesticide use is likely overestimated as well.*

5.4 Data Gaps

Manitoba does not have a comprehensive system in place to collect pesticide sales data. While the Manitoba Crop Insurance Corporation database provides a starting point, the accuracy of records input into the database is not verified. The database provides information that is difficult to work with as it does not provide the quantity of pesticide use and does not keep track of the area of land that the pesticides are applied to. Therefore, in order to obtain the quantity of pesticide use (kg), it is necessary to submit the data to a series of calculations (see section 5.2), creating the potential for further error on data that are likely already overestimated.

6.0 Ontario

6.1 Data Collection Methods

The Ontario Ministry of Agriculture and Food has undertaken a survey of agricultural pesticide use every 5 years since 1973. The reports contain data for pesticide use in field crops, fruit and vegetables and other crops (nursery, sod and ginseng). Other agricultural pesticide uses not included in the survey are: greenhouse sprayings, surfactants, seed treatments, livestock sprays or rodenticides. Agricultural pesticide use data in this report are from McGee, B., *et al.*, (2004).

6.2 Assumptions

- It is assumed that crops are treated with pesticides in the same fashion, no matter their location in the province. This could add imprecision to the results.
- Total pesticide use is estimated by multiplying the results obtained from the survey by an expansion factor (calculated as the ratio of total provincial area of a crop to that of the area of crop reported.)

  i.e. Calculation of expansion factor for soybeans

    Total area of soybeans in 2003 2,000,000 acres

    Total area of soybeans reported in survey 93,500 acres

    Therefore, the expansion factor for soybeans is: 2,000,000 / 93,500 = 21.39

  Estimation of metolachlor used on soybeans in the province

Total quantity of a.i. of metolachlor used on soybeans in the sample was 5,217.6 kg.
Therefore, the total quantity of active ingredient of metolachlor used on soybeans would be: 5,217.6 x 21.39 = 111,604 kg (McGee, B. *et al.*, 2004).

- Some crops and pesticides are not adequately represented in the survey and hence cannot be estimated. Therefore, the pesticide use may appear to be 0 when it actually is not. This could be due to the fact that the area of a crop is too small to calculate an estimation factor.
- Pesticides that are no longer licensed may be used until the quantities in storage are depleted.
- Pesticides used in quantities less than to 200 kg a.i. were aggregated into the "other" category.

6.3 Pesticide Use in Ontario

In Ontario's agricultural sector, 79.4% of pesticides used were herbicides, followed by nemotocides (7.9%), fungicides (7.4%), growth regulators (3.4% and insecticides (1.9%) (Figure 9, Table 12).

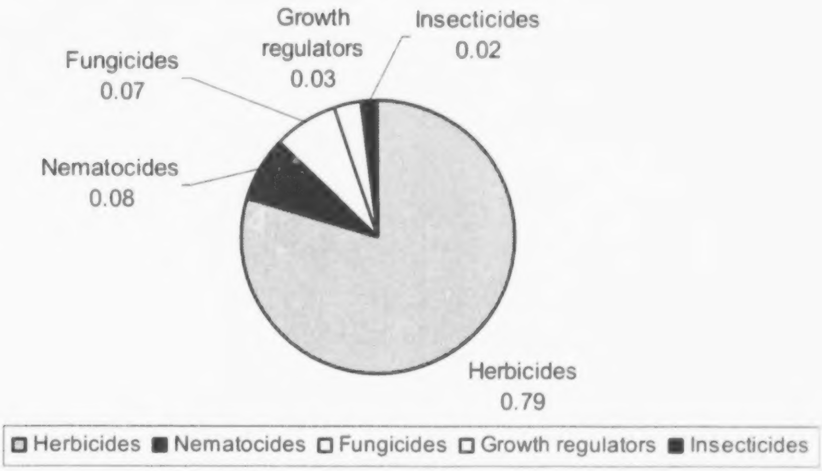

Figure 9: 2003 pesticide use in Ontario by type.

Table 12. 2003 pesticide use in Ontario by type

Pesticide Type	Quantity Used (kg)	Proportion (%)
Herbicides	3,348,118	79.37
Nematocides	332,021	7.87
Fungicides	313,912	7.44
Growth regulators	142,412	3.37
Insecticides	81,775	1.94
TOTAL	**4,218,238**	**100.00**

The use of glyphosate, primarily on field crops, has increased by 58% since 1998. Atrazine use, with 499,253 kg applied in 2003 to field corn alone, has been maintained at 80% of its 1998 usage. The uses of the third and fourth most applied pesticides, metolachlor and s-metolachlor have declined, on average, by 61%. The most marked decline in use was in soybean crops (66%), due in large part to the adoption of glyphosate resistant soybean technology, which is also responsible for the increase in glyphosate use. Table 13 shows the 20 pesticide active ingredients used in the largest quantities in 2003.

Table 13: Top 20 pesticide active ingredients used on crops in Ontario in 2003. Top 10 are listed in **bold.**

Active Ingredient	Type of Pesticide	Quantity Used (kg a.i.)	% of Use
Glyphosate	**Herbicide**	**1,170,762**	**27.75**
Atrazine	**Herbicide**	**513,950**	**12.18**
s-metolachlor	**Herbicide**	**286,923**	**6.80**
Metolachlor	**Herbicide**	**255,705**	**6.06**
1,3-dichloropropene	**Nematocide**	**239,824**	**5.69**
Dimethenamid	**Herbicide**	**205,291**	**4.87**
Dicamba	**Herbicide**	**195,627**	**4.64**
Fatty alcohol –N-decanol	**Growth regulator**	**133,856**	**3.17**
MCPA/MCPB	**Herbicide**	**129,337**	**3.07**
2,4-D	**Herbicide**	**87,261**	**2.07**
Pendimethalin	Herbicide	85,334	2.02
Chloropicrin	Nematocide	81,847	1.94
Bromoxynil	Herbicide	80,871	1.92
Mancozeb	Fungicide	64,647	1.53
Captan	Fungicide	61,422	1.46
Bentazon	Herbicide	59,300	1.41
Sulphur	Fungicide	54,106	1.28
Chlorothalonil	Fungicide	38,570	0.91
Metribuzin	Herbicide	36,966	0.88
Metiram	Fungicide	34,111	0.81

***6.3.1 Pesticide Use Trends in Ontario** (Comparison with 1998)*

When compared to 1998, there was a 14% increase in herbicide use on grains, attributed mainly to an increase in the area of winter wheat grown in 2003.

Pesticide use in fruit and vegetable crops decreased by 20%, with the largest decline occurring with insecticides in fruit (57 %), followed by fungicides (54%) in both fruit and vegetables. Decreases in apple acreage, increased use of IPM and alternate control strategies (border sprays for migratory pests, mating disruption, alternate row spraying and pest monitoring) are all responsible for declines in pesticide use.

6.3.2 Pesticide Usage on Crops in Ontario in 2003

Due to the large area that Ontario's field crops occupy, they received the largest quantity of pesticides. These crops include soybeans, field corn, wheat, barley, oats, rye, canola, tobacco, hay and flaxseed. Total pesticide use on these crops was 3,729,341 kg, with 8 of the top 10 pesticides being herbicides. Herbicides were most heavily input into both field crops and vegetables while fungicides were the most applied to fruit and nematocides for the "other" category. See Appendix 7 for amount of pesticides applied in Ontario by crop.

The intensity of pesticide use, measured in kg/ha, in Ontario has dropped considerably for all crops. In total, 1.09 kg a.i./ha were applied for all crops in 2003, down from 2.10 kg a.i/ha in 1983. Table 14 shows use intensity of pesticides for major crops for the years 1983, 1988, 1993 and 2003. Tobacco requires the highest use of pesticides (19.14 kg a.i./ha), followed by fruit (9.87 kg a.i./ha), vegetables (2.65 kg a.i./ha) and field crops (1.00 kg a.i./ha). However, field crops represent the majority of Ontario's agricultural efforts, hence diminishing the province's overall pesticide application rate.

Table 14: Total active ingredients used per hectare on major crops and for selected pesticide groupings in 1983, 1999, 1993, 1998 and 2003 (McGee, B. *et al.*, 2004).

Crop	Intensity of use (kg a.i./ha)				
	1983	1988	1993	1998	2003
Field Corn	3.47	2.9	2.9	2.28	1.77
Soybeans	3.52	3.27	1.65	1.5	1.48
Grains	0.44	0.58	0.72	0.56	0.58
Tobacco	39.77	31.56	18.78	9.65	19.14
Total field crops	1.92	1.63	1.63	1.15	1.00
Total fruit	19.81	20.64	20.64	20.34	9.87
Total vegetables	4.89	6.01	6.01	4.72	2.65
TOTAL	**2.10**	**1.85**	**1.85**	**1.35**	**1.09**

6.3.3 Pesticide Use in the Domestic Sector

While the province does not maintain records on domestic pesticide use, there have been studies carried out that address pesticide use in the sector. Within the domestic sector in Ontario, 10 chemicals comprise 95% of the total amount of active ingredients applied by lawn care applicators (Table 15).

Table 15: Active ingredients most frequently used by professional applicators for lawn care in Ontario (Struger et al., 2002).

Active Ingredients	% of total reported use
Mecoprop	19.34
2,4-D	17.28
Dicamba	14.61
Diazinon	9.80
Chlorpyrifos	9.66
Dichlorprop	8.04
2,4-DB	7.82
MCPA	3.72
B.t.	3.08
Glyphosate	1.43

6.4 Data Gaps

Ontario only collects data for pesticide use in field crops, fruit, vegetable, nursery, sod and ginseng. As the most populated province/territory in Canada, domestic use of pesticides has the potential to have large environmental impacts. This is particularly true of Southwestern Ontario, with its high population density.

7.0 Quebec

7.1 Data Collection Methods

Quebec has been compiling pesticide sales data since 1992. Le bilan des ventes de pesticides au Québec reports sales data in a multitude of ways: by pesticide use, by chemical group, by use sector and by regulatory classes. However, quantities of active ingredients are not disclosed individually in order to preserve confidentiality. Pesticide sales data for Quebec are from Gorse, I., 2005. The top 20 pesticides sold were provided by Isabelle Gorse.

7.2 Assumptions

- Pesticides that are brought in from out of province can not be accounted for.
- Pesticide sales are reported by chemical group in order to comply with Quebec's confidentiality laws (*La loi sur l'accès aux documents des organismes publiques et sur la protection des renseignements personnels*).

7.3 Pesticide Use in Quebec

In 2001, there were 3,276,257 kg of pesticide active ingredients sold in the province. The majority of these were applied to the province's corn and soya crops, occupying 498 923 and 148 070 hectares respectively (Giroux, I., 2002). Herbicide sales led the pesticide market with a 52.3% share. Within the top 10 active ingredients sold, 6 were herbicides, 2 were fungicides and 2 were insecticides (Gorse, I., 2005) (Figure 10, Table 16).

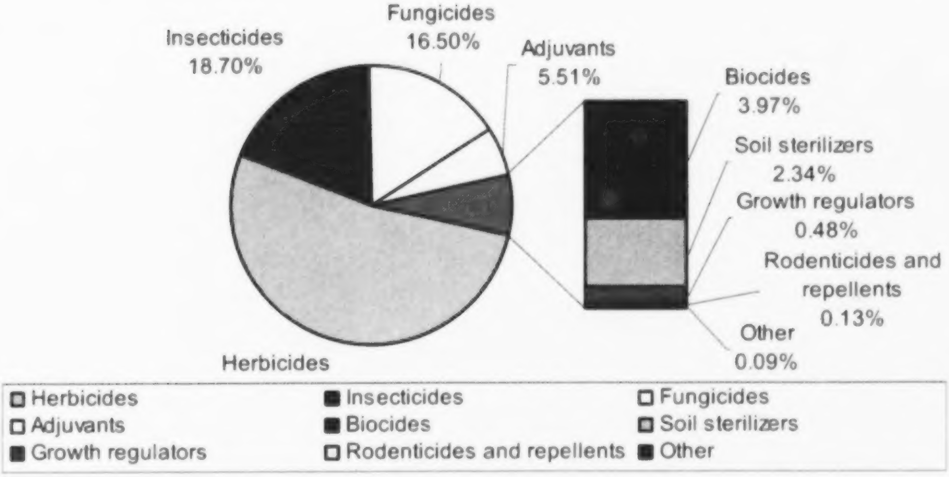

Figure 10: 2001 pesticide sales in Quebec by type

Table 16: 2001 pesticide sales in Quebec by type

Type of Pesticide	Quantity of sales (kg a.i.)	Proportion (%)
Herbicides	1,712,868	52.3
Insecticides	612,663	18.7
Fungicides	540,664	16.5
Adjuvants	180,474	5.5
Biocides	130,061	4.0
Soil sterilizers	76,711	2.3
Growth regulators	15,645	0.5
Rodenticides and repellents	4,288	0.1
Other	2,883	0.1
TOTAL	**3,276,257**	**100.0**

Glyphosate was the primary pesticide sold in 2001; it was applied throughout the province more than any other pesticide. Atrazine was sold in the second largest quantity, primarily due to the 498,923 ha of corn crops in Quebec (Giroux, I., 2002) (Table 17).

Table 17: Top 20 pesticides sold in Quebec in 2001. Top 10 are shown in **bold**. Quantities can not be disclosed due to confidentiality laws (see section 7.2).

Active Ingredient	Type
Glyphosate	**Herbicide**
Atrazine	**Herbicide**
Insecticidal mineral oil	**Insecticide**

s-Metolachlor	**Herbicide**
Naphtalene	**Insecticide**
Mancozeb	**Fungicide**
2,4-D amine	**Herbicide**
Metiram	**Fungicide**
Bentazon	**Herbicide**
Pendimethalin	**Herbicide**
Dicamba	Herbicide
Chlorothalonil	Fungicide
Captan	Fungicide
Dimethenamid	Herbicide
Mineral oil	Adjuvant
Nonylphenoxypolyethoxyethanol	Adjuvant
Metam	Fumigant
Herbicidal mineral oil	Herbicide
Mecoprop	Herbicide
Paradichlorobenzene	Insecticide

See Appendix 8, Table 41 for pesticides sales listed by chemical group. The active ingredients in each chemical group are also listed in Appendix 8.

7.4.1 Pesticide Sales Trends in Quebec

In 2001, there were 3,276,257 kg of pesticide active ingredients sold in the province. This continues the downward trend in total pesticide sales demonstrated in the province: 3.6% from 2000 and 12.7% from 1992 (Table 18). Sales of herbicides, insecticides, adjuvants and plant growth regulators are down when compared to 2000, while fungicide, biocide, soil fumingant and rodenticide sales have increased.

The uses of atrazine and metolachlor have been decreasing while the use of glyphosate has increased. Although recent years have seen increases in the sales of sulfonylurea pesticides, such as nicosulfuron, rimsulfuron, clopyralid, flumetsulam, they experienced a sharp decline in sales of 52.8% from 2000 to 2001 (Gorse, I., 2005; Giroux, I., 2002).

Table 18: Pesticide sales trends in Quebec since 1992

Year	Sales of active ingredients (kg)	Variation with respect to 1992
1992	3 753 509	0
1993	3 536 392	-5.8
1994	3 236 172	-13.8
1995	3 320 462	-11.5
1996	3 765 635	0.3
1997	3 381 942	-9.9
1998	3 220 896	-14.2
1999	3 343 873	-10.9
2000	3 398 272	-9.5
2001	3 276 257	-12.7

The decrease in the amount of pesticides sold after 1992 can partially be explained by new products that have emerged on the market that are effective when applied in smaller quantities. Therefore, the intensity of pesticide use reported has decreased without necessarily reducing the environmental impact.

The bilan des ventes de pesticides au Québec 2001 uses two different definitions for intensity of pesticide use:

i. Total amount of pesticide active ingredient (kg) sold divided by area (in hectares) of cultivated land
ii. Total amount of pesticide active ingredient (kg) sold divided by area of cultivated land excluding forage crops (hectares).

The second intensity measure is more representative of the environmental impact of pesticide use in Quebec as forage crops occupy 43% of cultivated land. Compared to many other crops, forages do not require much pesticide use.

In 2001, the total pesticide application rate for the province was 1.41 kg a.i./ha. When the forage crops are excluded from the equation, it increases to 2.46 kg a.i./ha. Comparatively, in 1992 the pesticide use intensities for total cultivated land and excluding forages were 1.73 kg a.i./ha and 3.65 kg a.i./ha respectively.

7.4.2 Pesticide sales by sector

The agricultural production sector dominated the market in pesticide purchases in 2001, representing 79.1% of sales. The agricultural sales are down 10,2% from 1992 when agricultural production sales represented 2,886,235 kg. a.i. in 2001. The report also includes data for livestock and other agricultural activities (pesticides used in and around farm buildings, etc.) This increases the agricultural sector's share of the market to 79.4%, meaning almost 80% of pesticide active ingredients applied in Quebec are in the agricultural sector (Table 19).

The domestic sector accounted for 10.8% of pesticide purchases in Quebec in 2001. This represents an important data gap in pesticide policy in Canada. Very few regions maintain records on pesticide use in the domestic sector, while it is potentially a large consumer of these products. In fact, in Quebec alone, 355,212 kg a.i. were sold to the domestic sector, translating into the use of approximately 400-500 different products. Within this sector, the vast majority of products sold are insecticides, 262,933 kg a.i., followed by herbicides (53,313 kg a.i.), fungicides (36,422 kg a.i.) and rodenticides and repellents (2,544 kg a.i.).

Table 19: Pesticide sales by sector and proportion of sales for each sector for 2001.

Sector	**Sales in 2001 (kg a.i.)**	**Proportion of sales 2001 (%)**
Agricultural production	2,591,716	79.1
Domestic	355,212	10.8
Green space maintenance	148,605	4.6
Industrial	143,464	4.4
Extermination	14,326	0.4
Livestock and other agricultural activities	9,805	0.3
Forestry	6,708	0.2
Other	6,421	0.2
TOTAL	**3,276,257**	**100.0**

7.5 Data Gaps

Quebec can not provide the quantities of active ingredients sold. As such, sales are reported by chemical groupings, which prohibit comparison of sales with those of other provinces.

8.0 New Brunswick

8.1 Data Collection Methods

Mark Boldon of the New Brunswick Department of Environment and Local Government has provided a summary of the province's pesticide sales data for the year 2003, the most recent year for which it is available. Data for sales of commercial and restricted pesticides were collected. Pesticide sales data for New Brunswick are from the New Brunswick Department of the Environment and Local Government, (2005).

8.2 Assumptions

- It is assumed that 1 L of a pesticide is equal to 1 kg.

- Quantities of active ingredients were calculated by multiplying the quantity of a pesticide sold by its percent guarantee. e.g. 7,941.00 kg of methomyl with a guarantee of 21.5% (7,941.00*0.215) is equal to 1,707.32 kg of a.i.
- To calculate the total amount of each active ingredient sold, the quantities of each active ingredient were added together.

8.3 Pesticide Use in New Brunswick

In 2003, 781,922.67 kg of pesticide active ingredients were sold in the province. Of these, 52.43% were fungicides, 25.67% were herbicides, 13.34% were growth regulators, 5.75% were insecticides, 2.32 % were anti-microbials, 0.29% was surfactants and 0.20% was rodenticides (Table 20, Figure 11). There were 133 different pesticide active ingredients sold in New Brunswick in 2003.

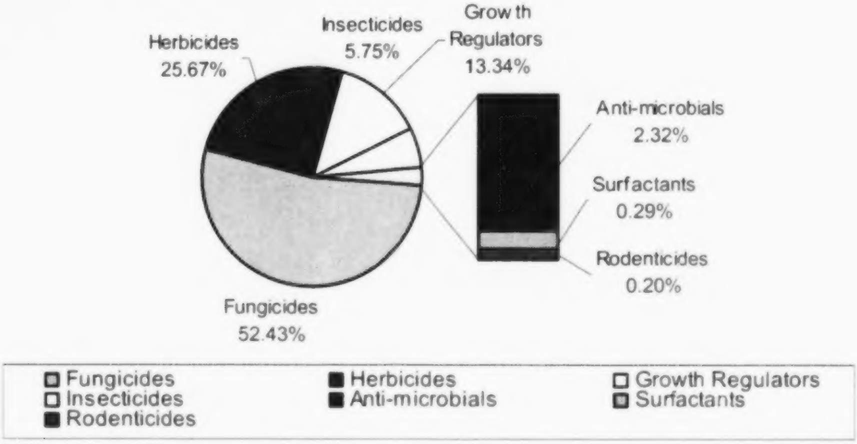

Figure 11: 2003 pesticide sales in New Brunswick by type

Table 20: 2003 sales of pesticides in New Brunswick by type

Pesticide Type	Sales (kg a.i.)	Proportion (%)
Fungicides	482,985.70	52.43
Herbicides	236,466.23	25.67
Growth Regulators	122,848.09	13.34
Insecticides	52,926.03	5.75
Anti-microbials	21,399.57	2.32
Surfactants	2,682.93	0.29
Rodenticides	1,830.01	0.20
TOTAL	**921,138.56**	**100.00**

Of the top 10 pesticide active ingredients (by quantity sold), 5 were herbicides (glyphosate, linuron, MCPA, metribuzin and triclopyr), 3 were fungicides (mancozeb, chlorothalonil and metiram), and 2 were insecticides (insecticidal mineral oil and imidacloprid). Mancozeb sold in the greatest quantity, at 383,277.97 kg a.i., followed by glyphosate (122,609.33 kg a.i.) and chlorothalonil (64,367.11 kg a.i.). In 2003, 20 pesticides represented 92.49% of the total quantity of pesticides sold in the province in 2003 (Table 21).

Table 21: Top 20 pesticides sold in New Brunswick in 2003. Top 10 are shown in **bold.**

Active Ingredient	Type of Pesticide	Quantity Sold (kg a.i.)	Proportion (%)
Mancozeb	**Fungicide**	**383,277.97**	**49.02**
Glyphosate	**Herbicide**	**122,609.33**	**15.68**
Chlorothalonil	**Fungicide**	**64,367.11**	**8.23**
Linuron	**Herbicide**	**35,722.50**	**4.57**
MCPA	**Herbicide**	**17,053.95**	**2.18**
Metribuzin	**Herbicide**	**15,919.38**	**2.04**
Metiram	**Fungicide**	**14,616.00**	**1.87**
Triclopyr	**Herbicide**	**9,744.89**	**1.25**
Mineral oil (insecticidal)	**Insecticide**	**9,271.80**	**1.19**
Imidacloprid	**Insecticide**	**7,821.80**	**1.00**
Endosulfan	Insecticide	6,137.40	0.78
Methomyl	Insecticide	5,791.08	0.74
Maleic hydrazide present as diethanolamine salt	Growth Regulator	5,680.26	0.73
Triforine	Herbicide	4,827.28	0.62
Metalaxyl	Fungicide	3,730.32	0.48
Hexazinone	Herbicide	3,571.16	0.46
Atrazine + related active triazines	Herbicide	3,530.69	0.45
Diazinon	Insecticide	3,292.33	0.42
Azinphos-methyl	Insecticide	3,174.68	0.41
2,4-D	Herbicide	3,083.51	0.39

8.4 Data Gaps

Reporting of domestic sales is not a requirement under the provincial legislation. As such, domestic pesticide sales data are not collected by the province.

9.0 Nova Scotia

9.1 Data Collection Methods

Brad Skinner, District Manager of Nova Scotia's department of Environment and Labour provided 2003 annual summaries of pesticides sold/used obtained from pesticide vendors.

9.2 Assumptions

Pesticides were reported by trade name. As such, the PMRA's ELSE Label Search was used in order to determine the active ingredients in the products. The total quantity of the pesticide sold/used was then multiplied by the guarantee to determine the quantity of active ingredient sold/used. Where the PCP number or active ingredients listed in the summaries did not match what was listed on ELSE, the information provided by ELSE was used.

9.3 Pesticide Use in Nova Scotia

In 2003, Nova Scotia reported the sales/use of 441,608.63 kg of pesticide active ingredients. Herbicides were used in the greatest quantity (67.76%) followed by fungicides (13.44%), others (9.64%), insecticides (8.60%), adjuvants (0.56%) (Figure 12, Table 22). The other category includes anti-microbials, fumigants, growth regulators, molluscicides and rodenticides.

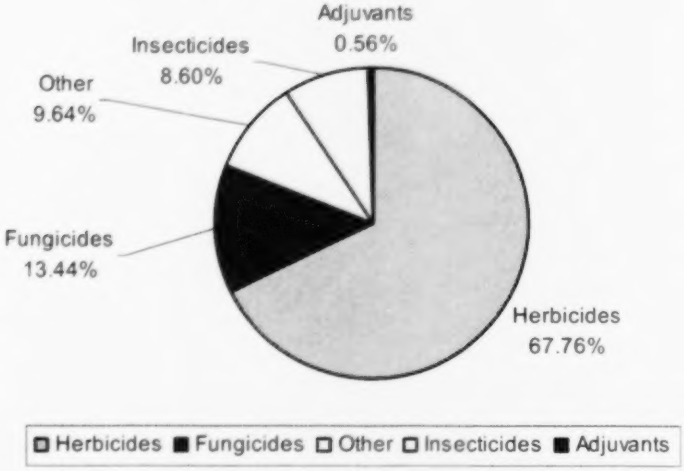

Figure 12: 2003 pesticide sales in Nova Scotia by type

Table 22: 2003 pesticides sales in Nova Scotia by type

Pesticide Type	Quantity Sold/Used (kg a.i.)	Proportion (%)
Herbicides	299,247.32	67.76
Fungicides	59,340.97	13.44
Others	42,567.58	9.64
Insecticides	37,993.74	8.60
Adjuvants	2,459.01	0.56
TOTAL	**441,608.63**	**100.00**

Within the top 10 pesticides in Nova Scotia, sales were as follows: 206,604.75 kg of mecoprop (46.78% of total sales), 41,212.68 kg of mineral and vegetable oils (insecticidal, herbicidal and adjuvant), 21,492.73 kg of hexazinone, 17,218.70 kg of glyphosate, 14,706.40 kg of metiram, 14,514.49 kg of captan, 11,532.00 kg of B.t. Berliner ssp. *kurstaki*, 10,502.90 kg of chlorothalonil, 9,848.40 kg of pendimethalin and 6,501.24 kg of mancozeb (Table 23).

Table 23: Top 20 pesticides sold/used in Nova Scotia in 2003. Top 10 are shown in **bold**.

Pesticide	Pesticide Type	Quantity (kg)	Proportion (%)
Mecoprop	**Herbicide**	**206,604.75**	**46.78**
Mineral and vegetable oils	**Insecticidal/Herbicidal/ Adjuvant**	**41,212.68**	**9.33**
Hexazinone	**Herbicide**	**21,492.73**	**4.87**
Glyphosate	**Herbicide**	**17,218.70**	**3.90**
Metiram	**Fungicide**	**14,706.40**	**3.33**
Captan	**Fungicide**	**14,514.49**	**3.29**
B.t.* Berliner ssp. *kurstaki	**Insecticide**	**11,532.00**	**2.61**
Chlorothalonil	**Fungicide**	**10,502.90**	**2.38**
Pendimethalin	**Herbicide**	**9,858.40**	**2.23**
Mancozeb	**Fungicide**	**6,501.24**	**1.47**
Atrazine + related active triazines	Herbicide	6,247.75	1.41
MCPA/MCPB	Herbicide	6,109.27	1.38
Carbaryl	Insecticide	5,773.16	1.31
Nicosulfuron	Herbicide	5,004.30	1.13
2,4-D	Herbicide	4,633.37	1.05
Linuron	Herbicide	4,540.10	1.03
Prometryne plus related active triazines	Herbicide	3,827.02	0.87
1,3-dichloropropene	Insecticide	3,795.98	0.86
Diazinon	Insecticide	3,786.27	0.86
Phorate	Insecticide	2,887.80	0.65

9.4 Data Gaps

Reporting of domestic sales is not a requirement under the provincial legislation. As such, domestic pesticide sales data are not collected by the province.

10.0 Prince Edward Island

10.1 Data Collection Methods

Data used in this report for Prince Edward Island were provided by Don Reeves, Manager of the Pesticide Regulatory program for the P.E.I. Department of Environment and Energy.

10.2 Assumptions

P.E.I. reports quantities of active ingredients sold within the following ranges:

- sales greater than 50,000 kg,;
- sales between 10,000kg and 50,000kg and;
- sales between 1,000kg and 4,999kg.

In order to attribute a numeric value, the average value was taken for each range; hence pesticide sales:

- in the greater than 50,000 kg category are assumed to be 50,000 kg
- between 10,000 kg and 50,000 kg are assumed to be 20,000 kg;
- between 1,000 kg to 9,999 kg category are calculated as 4,499.5 kg.

10.3 Pesticide Use in Prince Edward Island

According to the P.E.I.'s State of the Environment report, 90% of the pesticides sold in P.E.I. are used on row crops, primarily potatoes. The majority of these were fungicides, used primarily to prevent blight (Figure 13, Table 24). In 2002, 2 fungicide active ingredients, chlorothalonil and mancozeb, accounted for 74% of all pesticide sales (Table 25). *Note: as the combined sales of chlorothalonil and mancozeb account for 602,446 kg (74% of total sales), they are underestimated in this report.*

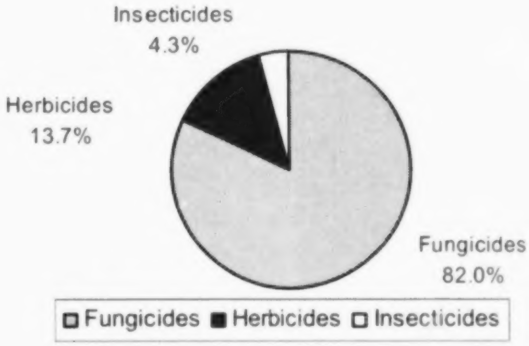

Figure 13: 2002 pesticide sales in P.E.I. by type

Table 24: 2002 Pesticide sales in P.E.I. by type

Type of Pesticide	2002 (kg of A.I.)*	Proportion of Sales (%)
Fungicides	667,862	82.0
Herbicides	111,237	13.7
Insecticides	35,004	4.3
TOTAL	**814,103**	**100.0**

* does not include mineral oil formulations

Table 25: 2002 pesticide sales by active ingredient in P.E.I.

Active Ingredient	Type of Pesticide	Quantity of a.i. sold (kg)
Chlorothalonil	Fungicide	50,000
Mancozeb	Fungicide	50,000
MCPA	Herbicide	28,999

Active Ingredient	Type of Pesticide	Quantity of a.i. sold (kg)
Diquat	Herbicide	20,000
Metalaxyl-m	Fungicide	20,000
Metiram	Fungicide	20,000
Sodium metaborate tetrahydrate	Herbicide	20,000
Glyphosate	Herbicide	8,999
1,3-Dichloropropene	Insecticide	4,499.5
Atrazine	Herbicide	4,499.5
Azoxystrobin	Fungicide	4,499.5
B.t.	Biological insecticide	4,499.5
Carbofuran	Insecticide	4,499.5
Copper, present as cupric hydroxide	Fungicide	4,499.5
Dimethoate	Insecticide	4,499.5
Endosulfan	Insecticide	4,499.5
Fluazifop-p-butyl	Herbicide	4,499.5
Glufosinate ammonium	Herbicide	4,499.5
Hexazinone	Herbicide	4,499.5
Imidacloprid	Insecticide	4,499.5
Linuron	Herbicide	4,499.5
Methamidophos	Insecticide	4,499.5
Metobromuron	Herbicide	4,499.5
Metribuzin	Herbicide	4,499.5
Paraquat	Herbicide	4,499.5
Propiconazole	Fungicide	4,499.5
Rimsulfuron	Herbicide	4,499.5
Sodium chlorate	Herbicide	4,499.5
Thiabendazole	Fungicide	4,499.5
Thiophanate-methyl	Fungicide	4,499.5

When compared to other provinces, the rate of application of pesticides in P.E.I. is very high. From 1993 to 2001, the maximum intensity was 4.1 kg a.i./ha in 1999 and the minimum intensity was 2.6 kg a.i./ha in 1995 (Table 26).

Table 26: Intensity of pesticide use in P.E.I. from 1993-2001 excluding 1994. (Prince Edward Island Department of the Fisheries, Aquaculture and Environment, 2003)

Year	1993	1995	1996	1997	1998	1999	2000	2001
Kg a.i./ha	2.8	2.6	3.9	3.0	3.2	4.1	4.0	3.0

Note: 1kg= 2.2 lbs and 1 ha= 2.47 acres

For the full 2002 Pesticide Sales Report for P.E.I. see Appendix 11.

10.4 Data Gaps

- As of 2002, P.E.I. no longer collects pesticide sales data.
- The 2002 Pesticide Sales Report only covers agricultural use of pesticides.

11.0 Newfoundland and Labrador

11.1 Data Collection Methods

George Ingram, of Newfoundland and Labrador's Department of Environment and Conservation, compiles a yearly report of commercial, domestic and restricted use pesticides used in the province.

11.2 Assumptions

- As data were not presented in standardized units, the appropriate mathematical conversions were undertaken to obtain quantities of active ingredients in kilograms.
- If the guarantee of a pesticide was reported as a percentage of kg of a solid product, or as g/L of a liquid product, the quantity of active ingredient was calculated by direct conversion of units
- If the guarantee was given as a percent of a liquid product, 1 L was assumed to be equal to 1 kg.
- For products with non-standard units, such as B.t., the total amount of the product applied, in kg or L, was used as opposed to calculating the amount of active ingredients.

11.3 Pesticide Use in Newfoundland and Labrador

In 2003, the government of Newfoundland and Labrador collected data on 42,400.32 kg of pesticide active ingredients. This accounted for the use of 57 different active ingredients in 91 assorted products. The majority of products used consisted of insecticides (82.36%), followed by herbicides (9.49%), fungicides (1.21%) and 6.94 % for other pesticides (including adjuvants, anti-microbials, repellents and rodenticides) (Figure 14, Table 27). Of the pesticides sold in 2003, 9 are no longer registered for use in Canada.

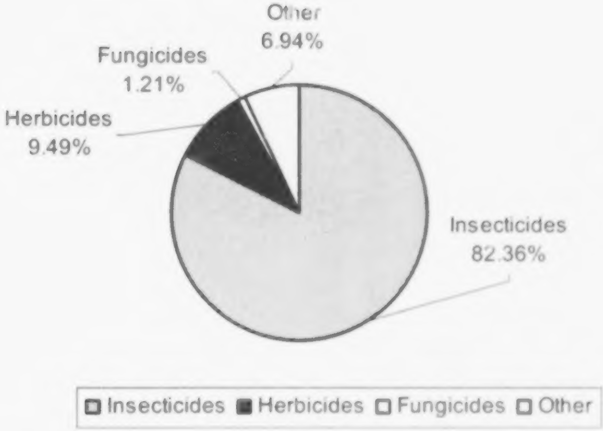

Figure 14: 2003 pesticide use in Newfoundland and Labrador by type.

Table 27: 2003 pesticide use in Newfoundland and Labrador by type.

Pesticide Type	Quantity Used (kg a.i.)	Proportion (%)
Insecticides	34,922.10	82.36
Herbicides	4,022.75	9.49
Others	2,944.50	6.94
Fungicides	510.98	1.21
TOTAL	**42,400.33**	**100.00**

At 19,827.12 kg, diazinon was the pesticide used in the largest quantity. This was followed by resmethrin at 3,900 kg; and B.t Serotype H-14 at 9,428 kg. The top 20 pesticide active ingredients, representing 99.22% of use in Newfoundland and Labrador, are presented in table 28.

For a full list of the active ingredients used in Newfoundland and Labrador in 2003, see Appendix 11.

Table 28: Top 20 pesticide active ingredients used in Newfoundland and Labrador in 2003. Top 10 are shown in **bold.**

Active Ingredient	Type of Pesticide	Amount Used (kg)	Proportion of Total Sales (%)
Diazinon	**Insecticide**	**19827.12**	**46.76**
Resmethrin	**Insecticide**	**3900.00**	**9.20**
B.t.Serotype H-14	**Insecticide**	**9428.00**	**22.24**
Active Ingredient	**Type of Pesticide**	**Amount Used (kg)**	**Proportion of Total Sales (%)**

Siloxylated polyether	**Adjuvant**	**2833.28**	**6.68**
2,4-D	**Herbicide**	**2182.67**	**5.15**
Carbaryl	**Insecticide**	**941.64**	**2.22**
Mecoprop	**Herbicide**	**459.81**	**1.08**
Glyphosate	**Herbicide**	**428.83**	**1.01**
Terbacil	**Herbicide**	**400.00**	**0.94**
Piperonyl Butoxide	**Insecticide**	**342.74**	**0.81**
Picloram	Herbicide	334.36	0.79
Permethrin	Insecticide	269.48	0.64
Quintozene	Fungicide	202.50	0.48
MCPP	Herbicide	108.00	0.25
Diflubenzuron	Insecticide	104.75	0.25
Dicamba	Herbicide	89.25	0.21
Iprodione	Fungicide	77.11	0.18
Chlorothalonil	Fungicide	76.00	0.18
Thiram	Fungicide	64.00	0.15
Pyrethrins	Insecticide	61.64	0.15

11.4 Data Gaps

The data for Newfoundland and Labrador does not have any significant data gaps.

12.0 The Yukon

12.1 Data Collection Methods

Hall, R., *et al.* (1995) surveyed pesticide sales and use in the Yukon. As there are no regulations in the Yukon requiring vendors to maintain accurate pesticide sale records, data were acquired from vendors who maintain records and estimated from vendors who do not. As such, pesticide use can only be determined qualitatively and not quantitatively. This is apparent in Table 46 (Appendix 12) in the case of *Bacillus thuringiensis*; the quantity sold is not estimated, however it was by far the most used pesticide in the territory (8,828 kg).

Additionally, the Yukon Territory is hoping to develop a database to maintain pesticide use records. Currently, the Territory maintains partial pesticide use data sets for 2004; however these records do not account for total pesticide use in the Yukon. Data for the total Vectobac and Aquabac (active ingredient is B.t.) volumes used for mosquito control in communities within the Yukon, excluding Whitehorse and records of sale of Rozol (gopher rodenticide) from a local business are available.

12.2 Assumptions

- Total quantities of pesticide sales and use in the Yukon are estimated by vendors and users;
- For products sold as liquid, 1L = 1 kg;
- B.t. was reported in total litres or kg applied;
- Pesticide quantities are an underestimation because the surveys were not able to capture all pesticide use due to low response rate (20%);

12.3 Pesticide Use in the Yukon

Due to its cold climate and geology, less than 2% of the Yukon's territory is suitable for agricultural purposes. As such, the largest use for pesticides is for controlling mosquitoes and biting flies followed by vegetation control on utility or transportation corridors (pipeline and railway right-of-ways). There are over 85 active ingredients in over 300 formulations that are available for use in the Yukon (Yukon DOE, 2002).

In 2004, 2988.4 kg of Aquabac and Vectobac (active ingredient B.t.) were applied for mosquito control in the Yukon, excluding the city of Whitehorse.

The quantities of the top 20 pesticides sold in the Yukon in 1994 were estimated by Hall *et al.* (1995) (Table 29). See Appendix 12, table 45 for complete list of estimated quantities of pesticides sold and used. B.t. is the most used pesticide in the Territory and is widely applied in mosquito control programs. According to Hall *et al.* (1995), creosote was sold in the largest quantity (683.59 kg) in 1994, followed by 2,4-D (45.46 kg), mecoprop (24.20 kg) and zinc napthenate (20.06 kg).

Table 29: Pesticides sold in the Yukon in 1994. (Hall *et al.*, 1995). Data based on actual records from vendors and estimates from vendors without records.

Active Ingredient	Type of Pesticide	Quantity Sold (kg)
Creosote	Wood preservative	683.59
2,4-D	Herbicide	45.46
Mecoprop	Herbicide	24.20
Zinc naphtenate	Wood preservative	20.06
Glyphosate	Herbicide	6.10
Dicamba	Herbicide	4.53
Copper naphtenate	Wood preservative	3.96
Mineral oil	Insecticide	1.21
Chlorpyrifos	Insecticide	1.05

Diazinon	Insecticide	0.65
Fatty acids	Herbicide	0.60
Thiram	Repellent	0.60
Asphalt	Insecticide	0.49
Resmethrin	Insecticide	0.48
Sulphur suphide	Fungicide	0.46
Bromacil	Herbicide	0.43
Potassium salts of fatty acids	Insecticide	0.37
Alkanolamine salts of fatty acids	Insecticide	0.25
Piperonyl butoxide	Insecticide	0.23
Dimethoate	Insecticide	0.21
Lemon grass	Repellent	0.19

12.4 Data Gaps

According to Verrin, S.M., *et al.* (2004), pesticides do not appear to be used in the forestry industry. However, this could be a reflection of lax reporting requirements or lack of data collection.

The Yukon does not keep a comprehensive record of pesticide sales or use. However, with the exception of mosquito and biting fly control programs, pesticide use is limited and does not compare in scale to that of the provinces.

13.0 The Northwest Territories

13.1 Data Collection Methods

The government of the Northwest Territories undertook its first survey of pesticide use for the years 1994 and 1995. The survey was in the form of a questionnaire that was sent to 333 potential users and 42 potential vendors. The response rate was only 50.93%. Pest control products designed for use on human skin were not included in this survey. Data used in this report are from Camillus Engineering Consultants Ltd. (1996).

13.2 Pesticide Use in the Northwest Territories

In 1995, there were 6 different pesticide products sold in the N.W.T., containing 7 different active ingredients. This resulted in the sales of 3.61 kg of active ingredients. However, there were 18 different active ingredients used within the Territory, resulting in the use of 8.96 kg of active ingredients. The quantities of pesticides reported to be used in the N.W.T. are higher than those sold, indicating that a large proportion of the pesticides used in the N.W.T. were purchased elsewhere, most likely Alberta, Ontario, and BC. (Table 30 and 31).

Insecticides (diazinon, chlorpyrifos) are the most frequently used pesticides in the NWT followed by herbicides (mecoprop, glyphosate), rodenticides, fungicides and wood preservatives.

Table 30: Pesticides used in the Northwest Territories in 1995.

Active Ingredient	Type of Pesticide	Quantity of Active Ingredients Used in 1995 (kg)
Diazinon	Insecticide	2.05
Mecoprop	Herbicide	2,00
Butoxypolypropylene	Repellent	1,09
Glyphosate	Herbicide	7.59×10^{-1}
Zinc/copper naphthenate	Anti-microbial	7.20×10^{-1}
Chlorpyrifos	Insecticide	4.54×10^{-1}
Benomyl	Fungicide	4.25×10^{-1}
2,4-D	Herbicide	3.80×10^{-1}
Bendiocarb	Insecticide	3.80×10^{-1}
Dicamba	Herbicide	3.60×10^{-1}
Silicon Dioxide	Insecticide	8.00×10^{-2}
Cypermethrin	Insecticide	7.60×10^{-2}
Piperonyl butoxide	Insecticide	6.85×10^{-2}
di-n-propyl Isocinchomeronate	Repellent	5.45×10^{-2}
Potassium salts of fatty acids	Insecticide	5.00×10^{-2}
Pyrethrins	Insecticide	1.79×10^{-2}
Bromadiolone	Rodenticide	3.60×10^{-3}
d-Cis, trans allethrin	Insecticide	2.20×10^{-4}
TOTAL		**8.96**

Zinc/copper naphthenate were the most frequently sold active ingredients in 1995, followed by diazinon, borax and piperonyl butoxide.

Table 31: Pesticides sold in the Northwest Territories in 1995

Active Ingredient	Type of Pesticide	Quantity of Active Ingredient Sold in 1995 (kg)
Zinc/copper naphtenate	Anti-microbial	3.32
Diazinon	Insecticide	1.92×10^{-1}
Borax	Insecticide	4.62×10^{-2}
Piperonyl butoxide	Insecticide	2.89×10^{-2}
Propoxur	Insecticide	9.50×10^{-3}
Tetramethrin	Insecticide	6.26×10^{-3}
Pyrethrins	Insecticide	3.60×10^{-3}
TOTAL		**3.61**

13.3 Data Gaps

The survey had a very low response rate; at least one vendor who sells a considerable amount of pesticides did not respond. Therefore, the total pesticides sold are most likely underestimated.

14.0 Nunavut

As Nunavut was created in 1999, pesticide use would fall under the 1995 Northwest Territories report. More recent pesticide sales or use data were not found for the Territory.

15.0 Data gaps

- From our reporting of provincial and territorial data, we found that there is no standardized way of reporting pesticide sales data. Many provinces and territories do not collect pesticide sales data. Those that do, do not report in the same manner/format (e.g., by kg of active ingredient, chemical groups, sector of use) or in the same years. This makes comparison between provinces difficult and necessitates the formulation of assumptions to develop a national picture.
- In some cases, available data are over a decade old; this no longer reflects current pesticide use. In that time, many new pesticides have become available while others have had changes in their registered use or have been discontinued due to voluntary company withdrawal or regulatory re-evaluation.
- Saskatchewan, the largest pesticide user in Canada, does not currently have pesticide sales data available. Saskatchewan Agriculture is currently developing a database. The contact for this information is Cameron Wilk (Saskatchewan Agriculture and Food; CWilk@agr.gov.sk.ca (306) 787-2195).
- Manitoba Agriculture, Food and Rural Initiatives does not collect sales data. A database is available, however, through Manitoba Crop Insurance Corporation that will allow for an estimation of the acreage of pesticide use. The data presented may be overestimated as farmers report only that

a pesticide was used, not the quantity, and not the proportion of the land that it was applied to.

- Quebec does not report pesticides by active ingredient, but by chemical groupings in order to comply with confidentiality laws.
- Ontario's pesticide survey deals specifically with field crops, fruit and vegetables and does not take account of pesticide use in other sectors.
- As of 2002, P.E.I. no longer collects pesticide sales data. As with other provinces, this management decision was taken in anticipation of the PMRA National Pesticide Sales Database. (Contact: Cameron Laing, Cameron_laing@hc-sc.gc.ca (613) 948-6031). The last report that the province released dealt specifically with agricultural pesticide use.
- Most jurisdictions do not collect domestic sales data. This presents a significant data gap as pesticides can be applied at high intensities locally that can result in high runoff.

16.0 Recommendations

- Should the need for this type of report be warranted in the future, efforts should be made with the provinces to standardize the pesticide sales data reporting format and frequency of reporting in order to simplify the development of a national picture on pesticide use and sales;
- A level of effort should be maintained by all provinces to continue their collection of pesticide use and sales data in the interim while they wait for other sources of data to fulfill their needs;
- Begin collection of domestic pesticide use data in order to ensure adequate protection of human health and the environment;
- This report, or reports of this type, should be updated every 5 years (2010);
- When available, much greater accuracy will be rendered through data collection efforts by the PMRA (pesticide sales data) and AAFC and Statistics Canada (pesticide use survey) and these data sources should prevail.

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Appendix 1: Assumptions and inconsistencies

Assumptions used in this report

Assumptions made when substituting sales data for pesticide use data. It is assumed that:

- pesticides purchased will be used within the same year.
- inventory carryover from one year to another will be reported, however this is typically not accounted for
- a product sold in one sector of use will be used in that particular sector. For example, a product bought from an agricultural supply vendor may be used for landscaping. This sale will be reported as an agricultural use: overvaluing agricultural use of pesticides and under representing landscaping in the sales data.
- the pesticides purchased in a province are used within the province. Provincial databases can not take into account pesticides that are brought in from out of province or that are sold in province and shipped out.

British Colombia – Data from 2003

- All data are sales data except for anti-microbials which were obtained by surveys of use
- If the guarantee for products sold as solids is given as a percent, the number of kilograms of a.i. was calculated directly using the appropriate multiplication. (e.g. If 500 kg of Sinbar (80% terbacil) are sold, then (500*0.8) 400kg of terbacil were sold.)
- If the guarantee for a liquid product is given in grams per litre (g/L) for liquid products, the number of kilograms of a.i. was calculated directly using the appropriate multiplication. (e.g. If 411 L of Round-up (356 g/L glyphosate) were sold, (411L*356 g/L /1000g) 146.32 kg of glyphosate were sold.
- Some products sold as liquids have the guarantee given as percent (e.g. Sevin Brand XLR Plus Carbaryl Insecticide, 42.8%). For these products one litre was assumed to equal one kilogram, consistent with MELP's standards for reporting pesticide use under permit requirements.
- Products, such as *Bacillus thuringiensis* have the percent guarantee reported in non-standard units. B.t is measured in bioactive units (btu or itu) per litre or per kilogram. For pesticide permit reporting, B.t is reported as total litres or kilograms applied without calculation of the active agent, in accordance with MELP's suggestions.

  The other major products for which the percent guarantee is reported in non-standard units are certain fumigants. For products such as Plant-Fume, the guarantee is reported as grams or percent in smoke. The quantity of these products sold was also considered equivalent to the active ingredient. (ENKON Environmental Limited, 2001)

Alberta – data from 1998

- Products sold are used in the year of sale;
- Domestic products shipped to vendors were sold in 1998 and not carried over into the next year;
- Specific gravity of all pesticides was assumed to be 1.0;
- Biological pesticides, such as B.t., will be reported assuming 100% active ingredient.

Manitoba – data from 2003

The use data presented in the database will tend to be an overestimation as the farmers report only that a pesticide was used, not the quantity, and not the proportion of the land that it was applied to. Additionally, multiple pesticide applications are considered in the database. As such, in order to calculate the quantities of pesticide active ingredients used, the following steps were taken:

- A search of product labels was undertaken (available on the manufacturer's websites), in order to determine the active ingredients guarantees for the products as well as the application rates
- When more than one application rate existed, the average of all the rates was taken. i.e, application rate of 1.0 – 1.5 kg/ha, the rate retained was 1.25 kg/ha
- The rate of application for each active ingredient in the product was then calculated:
  - For solids where the guarantee is given in percent by multiplying the application rate of the product by the percent guarantee for the active ingredient.
    - i.e. for a product with an application rate of 1.0 kg/ha containing an active ingredient with a percent guarantee of 41%, the active ingredient would have an application rate of 0.41 kg/ha.
  - For products where the application rates are given in L/ha and the guarantee is given in g/L, the guarantee for each active ingredient was multiplied by the application rate.
    - i.e. Assert has an application rate of 1.50 L/ha. Its active ingredient, imazamethabenz, has a guarantee of 300 g/L. As such its application rate is (1.5 L/ha * 300 g/L) 0.45 kg/L.

- The acreage of land that a product was applied to was converted in hectares by multiplying by 0.405.
- For each product used, the quantities of active ingredients applied were calculated by multiplying the application rates (kg/ha) by the area of land that it was applied to (ha) in order to obtain kg.
  i.e. Imazamethabenz, with an application rate of 0.45 kg/ha, was potentially applied to 140,886.00 ha of land. As such, the total quantity of imazamethabenz applied was (0.45 kg/ha * 140,886.00 ha) 63,708.65 kg a.i.

Ontario –data from 2003

- Pesticide use data
- It is assumed that crops are treated with pesticides in the same fashion, no matter their location in the province. This could add imprecision to the results.
- Total pesticide use is estimated by multiplying the results obtained from the survey by an expansion factor (calculated as the ratio of total provincial area of a crop to that of the area of crop reported.)

e.g. Calculation of expansion factor for soybeans
Total area of soybeans in 2003 2,000,000 acres
Total area of soybeans reported in survey 93,500 acres
Therefore, the expansion factor for soybeans is: 2,000,000 / 93,500 = 21.39
Estimation of metolachlor used on soybeans in the province
Total quantity of a.i. of metolachlor used on soybeans in the sample was 5,217.6 kg.
Therefore, the total quantity of active ingredient of metolachlor used on soybeans would be: 5,217.6 x 21.39 = 111,604 kg
(McGee, B., H. Berges and K. Callow, 2004).

- Some crops and pesticides are not adequately represented in the survey and hence cannot be estimated. Therefore, the pesticide use may appear to be 0 when it actually is not. This could be due to the fact that the area of a crop is too small to calculate an estimation factor.
- Pesticides that are no longer licensed may be used until the quantities in storage are depleted.
- Pesticides used in quantities below 200 kg a.i. were aggregated into the "other" category.

Quebec – data from 2001

- Pesticides that are brought in from out of province can not be accounted for.
- Pesticide sales are reported by chemical group in order to comply with Quebec's confidentiality laws (*La loi sur l'accès aux documents des organismes publiques et sur la protection des renseignements personnels*).

New Brunswick – data from 2003

- Sales data
- It is assumed that 1 L of a pesticide is equal to 1 kg.
- Quantities of active ingredients were calculated by multiplying the quantity of a pesticide sold by its percent guarantee. e.g. 7,941.00 kg of methomyl with a guarantee of 21.5% (7,941.00*0.215) is equal to 1,707.32 kg of a.i.
- To calculate the total amount of each active ingredient sold, the quantities of each active ingredient were added together.

Nova Scotia – data from 2003

Pesticides were reported by trade name. As such, the PMRA's ELSE Label Search was used in order to determine the active ingredients in the products. The total quantity of the pesticide sold/used was then multiplied by the guarantee to determine the quantity of active ingredient sold/used. Where the PCP number or active ingredients listed in the summaries did not match what was listed on ELSE, the information provided by ELSE was used

P.E.I. – data from 2002

- Pesticide sales data
- P.E.I. reports quantities of active ingredients sold within the following ranges: sales greater than 50,000kg, sales between 10,000kg and 50,000kg and sales between 1,000kg and 4,999kg. In order to attribute a numeric value, sales that fell in the greater than 50,000kg category are assumed to be 50,000kg. The middle value was taken for all pesticides sales that fell within the other 2 ranges; hence those that were between 10,000kg and 50,000kg are assumed to be 20,000kg and those that were in the 1,000kg to 9,999kg category are calculated as 4499.5 kg.

Newfoundland and Labrador – data from 2003

- Pesticide use data
- As data were not presented in standardized units, the appropriate mathematical conversions were undertaken to obtain quantities of active ingredients in kilograms.
- If the guarantee of a pesticide was reported as a percentage of kg of a solid product, or as g/L of a liquid product, the quantity of active ingredient was calculated by direct conversion of units
- If the guarantee was given as a percent of a liquid product, 1 litre was assumed to be equal to 1 kilogram.
- For products with non-standard units, such as B.t., the total amount of the product applied, in kg or L, was used as opposed to calculating the amount of active ingredients.

The Yukon – Data from 1994

- Total quantities of pesticide sales and use in the Yukon are estimated by vendors and users.
- For products sold as liquid, 1L = 1 kg.
- B.t. was reported in total litres or kg applied
- Pesticide quantities are an underestimation.
- Pesticides brought in from out of province are not included in the report.
- Low response rate to the surveys (20%): vendors did not participate in the survey for many reasons: no record keeping systems in place, too difficult and time consuming to find the requested information without advance notice, bad timing of survey (winter)

N.W.T. – data from 1995

- Pesticide use data

Table 32: Inconsistencies in reporting between provinces

Parameter	B.C.	Alta.	Sask.	Man.	Ont.	Que.	N.B.	N.S.	P.E.I.	N.L.	Y.T.	N.W.T.
Year of data used	2003	1998	n/a	2003	2003	2001	2003	2003	2002	2003	1994	1995
Frequency of reporting	4 reports (1991, 1995, 1999 and 2003)	2 reports (1993 and 1998).	n/a	n/a – database contains data for 2001-2003	Every 5 years since 1973.	Annually since 1992.	Annually	Annually	No longer collects pesticide sales data.	Annually	Collects use of B.t. for mosquito control. One report in 1995.	One report covering 1994-1995.
Origin of data	Sales and use	Sales	n/a	Use	Use	Sales	Sales	Sales	Sales	Use	Sales and use	Sales and use
Units	kg a.i.	kg a.i.	n/a	Acreage of potential use.	kg a.i.	kg a.i. per chemical group	L/kg a.i.	kg a.i.	Categories of use (>50,000 kg, 10,000kg 50,000kg, 1,000kg-9,999 kg)	Volume of pesticide product used (g, kg, L, mL)	Kg a.i.	g a.i.
How was product reported?	a.i.	a.i.	n/a	Trade name	a.i.	Chemical grouping	a.i.	Trade name	a.i.	Trade name	a.i.	a.i.
Sectors of use reported	Agriculture, Industry, Forestry, Domestic, Landscaping, Golf courses	Agriculture, Domestic, Industry (forestry, landscaping, golf courses, municipal), Livestock, Structural	n/a	Agriculture	Agriculture	Agriculture, livestock, domestic, landscaping, forestry, industry, extermination	Commercial/ Restricted	Commercial/Restricted	Agriculture	Sectors which use products with Commercial, Restricted or Domestic labels.	Municipal use for mosquito and fly control, agriculture, domestic use	n/a

n/a: data was not available for the province, or was not provided.

Appendix 2: Pesticide sales and use in Canada

Table 33: **Quantities (kg) of pesticide active ingredients sold or used in Canada**. Top 10 are shown in **bold.**

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001) *	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Glyphosate	**H**	**126,269.00**	**2,682,748.86**	**479,726.13**	**1,170,762**	**1**	**122,609.33**	**17,218.70**	**8,999**	**428.83**	**4.53**	**1.09**	**4,608,767.47**	**11**
Creosote	**AM**	**2,163,142.00**	**805.16**								**45.46**		**2,163,992.61**	**3**
MCPA	**H**	**23,598.00**	**885,239.13**	**450,091.49**	**129,337**		**17,053.95**	**6,109.27**	**28,999**				**1,540,427.84**	**7**
2,4-D	**H**	**18,543.00**	**765,820.39**	**609,004.71**	**87,261**	**7**	**3,083.51**	**4,633.37**		**2182.67**	**24.20**	**0.43**	**1,490,553.27**	**10**
CCA	**AM**	**824,100.00**											**824,100.00**	**1**
Triallate	**H**	**2,248.00**	**693,178.48**	**12,129.48**									**707,555.96**	**3**
Mancozeb	**F**	**34,888.00**	**45,813.94**	**70,231.05**	**64,647**	**6**	**383,277.97**	**6,501.24**	**50,000**				**655,359.19**	**8**
Ethalfluralin	**H**	**1,546.00**	**452,294.41**	**144,201.08**									**598,041.49**	**3**
Atrazine + related active triazines	**H**	**11,535.00**	**5,753.81**	**7,852.87**	**513,950**	**2**	**3,530.69**	**6,247.75**	**4,499.5**				**553,369.61**	**8**
Bromoxynil	**H**	**2,990.00**	**268,105.29**	**191,936.39**	**80,871**		**57.40**	**210.60**					**544,170.68**	**6**
Surfactant Blend	A	7,498.00	496,561.74				852.93	653.75					**505,566.42**	4
Mineral Oil	A/G/H/I	340,683.00	3,477.36			3 (I), 15(A), 18 (H)	9,271.80	41,212.68		19.78	1.05		**394,665.67**	6
Petroleum Hydrocarbon Blend	A	7,232.00	368,704.26										**375,936.26**	2
Dicamba	H	3,627.00	138,278.65	15,899.63	195,627	11	1,562.22	1,042.53		89.25	3.96	0.38	**356,130.62**	10
Trifluralin	H	3,408.00	230,028.22	65,382.51	16,889		910.14	478.67					**317,096.54**	6
s-metolachlor	H	3,892.00			286,923	4		2,849.76					**293,664.76**	4
Chlorothalonil	F	33,505.00	37,333.96	30,710.87	38,570	12	64,367.11	10,502.90	50,000	76.00			**265,065.84**	9
Metolachlor	H	29.90	4,297.85		255,705		289.80	1,514.55					**261,837.10**	5

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Chlorpyrifos	I	4,561.00	217,397.54	20,854.47	5,366		2,749.32	1,715.06		4.32	0.65	0.72	**252,649.07**	9
Mecoprop	H	4,417.00	27,264.09	8,657.53	703	19	1,237.66	206,604.75		567.81	20.06	2035.20	**251,507.11**	10
1,3-dichloropropene	I				239,824			3,795.98	4,499.50				**248,119.48**	3
Imazamethabenz	H	1,760.00	173,679.21	63,708.65									**239,147.86**	3
Glufosinate Ammonium	H	2,330.00	63,863.79	124,972.38	13,602		2,243.55	32.20	4,499.50				**211,543.42**	7
Dimethanamid	H				205,291	14							**205,291.00**	2
Paraffin Base Mineral Oil	A	4,952.00	193,162.56				24.07	473.10					**198,611.73**	4
DDAC	AM	174,635.00	120.60					29.47					**174,785.08**	3
Bentazon	H	1,784.00	12,066.24	81,837.41	59,300	9	156.48	607.12					**155,751.25**	7
Tralkoxydim	H	2,064.00	126,323.46	22,920.02	323								**151,630.48**	4
Pentachlorophenol	AM	147,684.00											**147,684.00**	1
Sulphur	F/I/Ro	73,408.00	8,641.52	1.18	54,106		8.90	2,848.68					**139,014.28**	6
Fatty alcohol- N-decanol	G				133,856								**133,856.00**	1
Iprodione	F	4,416.00	9,592.72	112,603.34	2,956		667.80	1,084.33		77.11			**131,397.30**	7
B.t. Berliner ssp. kurstaki	I	85,765.00	28,273.50				160.00	11,532.00		15.00			**125,745.50**	5
Carbathiin	F	1,244.00	122,292.00					72.24		25.60			**123,633.84**	4
Metiram	F	15,293.00	14,862.40	9,600.77	34,111	8	14,616.00	14,706.40	20,000				**123,189.57**	8
Dichlorprop	H	1,131.00	40,942.40	60,759.30	9,459		14.10	72.00					**112,377.80**	6
Nonylphenoxypolyethoxyethanol	A	8,781.00	94,247.33			16	1,830.00	1,239.68					**106,098.01**	5
Captan	F	25,500.00	286.84		61,422	13	2,517.16	14,514.49					**104,240.49**	6
Fenoxaprop-p-ethy	H	915.00	59,919.01	38,899.91									**99,733.92**	3
Pendimethalin	H	2,055.00	1,061.09		85,334	10		9,858.40					**98,308.49**	5

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Vinclozolin	H	852.00	25,823.10	62,763.89	899		116.00	21.50					**90,475.49**	6
Linuron	H	4,639.00	8,753.95	12,812.05	17,634		35,722.50	4,540.10	4,499.50				**88,601.10**	7
Sethoxydim	H	815.00	58,678.49	28,158.54	335		3.13	26.16					**88,016.32**	6
Chloropicrin	S	998.00			81,847			799.92					**83,644.92**	3
Metribuzin	H	188.00	7,601.35	15,974.94	36,966		15,919.38	505.00	4,499.50				**81,654.17**	7
Clopyralid	H	1,321.00	59,019.74	17,086.04	3,641		9.13	57.10					**81,134.02**	6
Paraffin Base Petroleum Oil	A	1,839.00	77,427.17										**79,266.17**	2
Carbaryl	I	12,363.00	3,142.85	49,295.51	4,851		1,906.56	5,773.16		941.64			**78,273.72**	7
ACQ	AM	74,448.00											**74,448.00**	1
Ammonium Sulphate			71,104.45					39.20					**71,143.65**	2
Propiconazole	F	5,481.00	5,664.41	46,164.89	2,648		2,186.00	548.13	4,499.50	55.29			**67,247.22**	8
Diazinon	I	27,074.00	4,087.29		3,970		3,292.33	3,786.27		19827.12	0.60	2.04	**62,039.64**	8
Clodinafop-Propargyl	H	658.00	34,408.89	25,868.48									**60,935.37**	3
B.t., Serotype H-14	I	39,153.00	11,079.80				3.54	352.00		9428.00			**60,016.34**	5
Lindane	I	249.00	56,743.67										**56,992.67**	2
2,4-DB	H	882.00	20,950.29	2,123.63	28,256		1,637.80	704.75					**54,554.47**	6
Diquat	H	2,283.00	21,765.03	6,393.99	2,107		1,177.80	93.80	20,000	0.48			**53,821.10**	8
EPTC	H	600.00	38,574.22	10,054.77	1,945		528.00	1,248.00					**52,949.99**	6
Silicon Dioxide	I	46.50	47,025.17								0	0.36	**47,072.03**	4
Triclopyr	I	450.00	30,311.81				9,744.89	1,158.72		47.04	0.10		**41,712.55**	6
Disodium Octaborate Tetrahydrate	AM	40,281.00	1,033.53										**41,314.53**	2
Fluoroxypyr	I		23,700.75	16,499.46									**40,200.21**	2

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Trichlorfon	Ro	1.28	34,334.33		221		1,002.96	42.00					**35,601.57**	5
Hexazinone	H	131.00	2,428.14	3,245.02			3,571.16	21,492.73	4,499.5				**35,367.55**	6
Imazethapyr	H	70.00	10,528.55	5,005.61	17,338		0.24						**32,942.40**	5
Tebuconazole	F	1.92		24,900.88	5,788								**30,690.80**	3
Malathion	I	4,658.00	22,316.45	1,104.63	1,543		565.60	319.03			0.18		**30,506.89**	7
Metam	S	28,582.00	410.67		441	17							**29,433.67**	4
Dimethoate	I	4,155.00	4,883.44	4,502.97	6,558		1,476.48	856.32	4,499.5	24.09	0.19		**26,955.98**	9
Copper Oxychloride	F	19,562.00	220.19		6,318		50.00	39.00					**26,189.19**	5
Difenzoquat	H		9,585.50	16,146.35									**25,731.85**	2
Nicosulfuron	H	116.00	166.65	1,748.40	18,360			5,004.30					**25,395.35**	5
Phorate	I		19,209.00	2,398.74			878.40	2,887.80					**25,373.94**	4
Related triazines	H				25,241								**25,241.00**	1
Thiram	F	1,098.00	22,791.71				777.31	99.55		64.00	0.49		**24,831.06**	6
Metalaxyl-m	F	2,504.00		2,092.86				108.53	20,000				**24,705.39**	4
Azinphos-Methyl	I	6,499.00	260.64	3,512.42	9,905		3,174.68	252.63					**23,604.37**	6
Quizalofop-ethyl	H		23,101.02		371		5.76						**23,477.78**	3
Flumetsulam	H				22,807								**22,807.00**	1
Paraquat	H	5,418.00	4,820.41	3,206.58	1,271		2,631.20	228.20	4,499.5				**22,074.89**	7
Endosulfan	I	4,729.00	761.06	1,823.00	3,689		6,137.40	387.00	4,499.5				**22,025.96**	7
Formaldehyde	F	21,822.00	96.20				2.95	77.93					**21,999.07**	4
Sodium Metaborate Tetrahydrate	H	37.50	1,616.28						20,000				**21,653.78**	3
Fluazifop-p-butyl	H	1,621.00	12,913.99	1,537.36			321.89	425.00	4,499.5				**21,318.74**	6

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Quintozene	F	8,848.00	9,808.85				18.75	2,414.25		202.50			**21,292.35**	5
Lime sulphur (calcium polysulphide)	F	20,524.00	223.98				19.80	41.80					**20,809.58**	4
Methyl Bromide	S	18,808.00	1,850.86										**20,658.86**	2
Carbofuran	I	484.00	6,413.38	6,186.10	1,778		789.44	90.80	4,499.5				**20,241.22**	7
Metalaxyl	F	418.00	3,796.19	137.27	10,891		3,730.32	813.59					**19,786.37**	6
Imidacloprid	I	528.00	9.54	5,938.67	527		7,821.80	248.42	4,499.5				**19,572.93**	7
Clethodim	H	141.00	2,490.66	16,649.22			221.64	26.91					**19,529.43**	5
Benomyl	F	3,259.00	14,616.34				144.00	291.50		1.00		0.45	**18,312.29**	6
Phosmet	I	2,088.00	370.00	401.00	12,362		41.50	2,454.00					**17,716.50**	6
Thifensulfuron Methyl	H	395.00	13,697.52	2,965.03	613			9.32					**17,679.87**	5
Acrolein	H		17,520.48										**17,520.48**	1
Picloram	H	592.00	15,109.40							334.36			**16,035.76**	3
Simazine plus related active triazines	H	8,680.00	3,688.13				2,483.68	490.27		4.45			**15,346.54**	5
Fosetyl-Al	F	8,088.00	166.34		5,373			541.15					**14,168.49**	4
Octylphenoxypoly ethoxyethanol	A	3,133.00	9,218.96				594.00	10.40					**12,956.36**	4
Copper hydroxide	F	3,524.00		771.41	8,371			42.72					**12,709.14**	4
Ethofumesate	H		12,559.40										**12,559.40**	1
Rimsulfuron	H	5.27	63.18	1,050.56	6,212		388.76	145.34	4,499.5				**12,364.61**	7
Terbufos	I	3,210.00	6,697.80		1,729		448.65	234.00					**12,319.45**	5
Iodocarb (IPBC)	F	11,822.00											**11,822.00**	1
Acephate	I	985.00	257.59		9,402		181.95	82.13		0.00	683.59		**11,592.26**	7

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Ammonium sulfamate	H		10.43		11,230								**11,240.43**	2
Silica Aerogel	I	62.40	11,052.49							2.00			**11,116.89**	3
Diuron	H	770.00	9,919.27		299			9.60					**10,997.87**	4
Thiabendazole	F	153.00	3,187.22				3,053.25	7.20	4,499.5				**10,900.17**	5
B.t.	I				6,140				4,499.5				**10,639.50**	2
Azoxystrobin	F	3,918.00		1,276.30			855.08	15.25	4,499.5	0.50			**10,564.63**	6
Polyoxyalkylated Alkyl Phosphate Ester	A	527.00	9,339.98										**9,866.98**	2
Methamidophos	I	984.00	19.20	417.86	981		2,900.16	14.40	4,499.5				**9,816.12**	7
Amitrole	H	670.00	2,026.47	2,645.55	4,169								**9,511.02**	4
Napropamide	H	5,361.00	294.55		2,786		125.57	722.09					**9,289.21**	5
B.t. israelensis	I										8828.00		**8,828.00**	1
Dazomet	S	8,179.00	627.20										**8,806.20**	2
Soap	I/H	7,402.00	1,221.52					110.50		10.50	0.08		**8,744.60**	5
Maneb	F	43.20	8,462.01					1.00					**8,506.21**	3
Maleic Hydrazide	G	2,210.00	551.74				5,680.26	36.16					**8,478.16**	4
Tribenuron Methyl	H	143.00	6,763.61	1,198.77			223.71	26.05					**8,355.14**	5
Ethylene bisdithiocarbamate	F			8,314.66									**8,314.66**	1
Dichlobenil	H	6,645.00	728.23		402		344.64	66.24					**8,186.11**	5
Flufenacet	H				8,032								**8,032.00**	1
Thiophanate-Methyl	F	2,171.00	859.40				6.30	268.40	4,499.5				**7,804.61**	5
Dichloropropene	S				7,592								**7,592.00**	1
Imazamox	H	18.70	4,231.83	3,199.90									**7,450.43**	3

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Propamocarb Hydrochloride	F	3,082.00	1,271.25				2,787.38	100.25					**7,240.87**	4
Methomyl	I	338.00	434.53		558		5,791.08	77.74					**7,199.35**	5
Diflufenzopyr	H				6,996								**6,996.00**	1
Triforine	F	1,841.00	20.62				4,827.28	16.38					**6,705.28**	4
Cupric hydroxide	F		252.50				1,557.07		4,499.5				**6,309.07**	3
Ethametsulfuron methyl	H	26.80	4,636.41	1,593.48				0.96					**6,257.65**	4
Prometryne plus related active triazines	H	294.00			1,916		2.20	3,827.02					**6,039.22**	4
Propanil	H		1,616.00	4,280.36									**5,896.36**	2
Sodium Chlorate	H	16.60	729.15						4,499.5				**5,245.25**	3
Fatty alcohol-cntrol	G				5,136								**5,136.00**	1
Metobromuron	H						630.40		4,499.5				**5,129.90**	2
Metallic copper	F				5,058								**5,058.00**	1
Terbacil	H	547.00	891.20		609		2,328.00	251.20		400.00			**5,026.40**	6
Cyanazine	H	96.00	3,891.60		443		192.00	291.40					**4,914.00**	5
Cypermethrin	I	199.00	439.63	194.49	1,810		1,702.00	495.45				0.08	**4,840.65**	7
Permethrin	I	724.00	397.24		647		2,047.65	683.22		269.48			**4,768.59**	6
Ferbam	H	2,284.00	77.61		1,898		187.10	27.60					**4,474.32**	5
Phosalone	I	1,878.00	5.62		1,801		207.50	497.50					**4,389.62**	5
Deet	R		4,167.87										**4,167.87**	1
Quizalofop-p-Ethyl	H	380.00	2,669.69	1,021.02									**4,070.71**	3
Tallow fatty acid	G		3,272.20		499		192.00						**3,963.20**	3
Folpet	I		54.81		3,280		468.50	110.00					**3,913.31**	4

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Resmethrin	I		2.37							3900.00	0.46		**3,902.83**	3
Ethephon	F	704.00	31.20		2,868		4.80	57.00					**3,665.00**	5
MCPB	H	15.80	3,271.50	315.12			10.42						**3,612.84**	4
Bromacil	H	55.00	3,106.91				241.92				0.37		**3,404.19**	4
Flucarbazone	H	111.00		3,285.64									**3,396.64**	2
Diclofop-Methyl	H	45.40	3,239.92				5.68	34.95					**3,325.95**	4
Siloxylated polyether	A	450.00						16.98		2833.28			**3,300.26**	3
Copper Sulphate	F	32.50	316.09		922			1,936.19					**3,206.78**	4
Fomesafen	F				3,077								**3,077.00**	1
Naled	I	1,409.00	1,257.89		315			39.19					**3,021.08**	4
Tefluthrin	I	239.00			2,583			39.00					**2,861.00**	3
Myclobutanil	F	1,613.00	16.80		740		175.18	164.42		2.58			**2,711.98**	6
Dinocap	F	2.19			2,627			47.61					**2,676.80**	3
Isoxaflutole	H	56.40			2,565								**2,621.40**	2
Pyraclostrobin	F	347.00		2,059.25	204			3.63					**2,613.88**	4
Fludioxonil	H	2,112.00					455.01	11.60					**2,578.61**	3
Prosulfuron	H				2,567								**2,567.00**	1
Zineb	F	1,832.00	491.68					104.00					**2,427.68**	3
Aluminum Phosphide	I	196.00	2,215.71										**2,411.71**	2
Desmedipham	H	30.00	2,334.75										**2,364.75**	2
Phenmedipham	H	30.00	2,330.25										**2,360.25**	2
Methyl isothiocyanate	I				2,317								**2,317.00**	1
Cycloate	H		2,289.60										**2,289.60**	1

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Ziram	F	2,227.00											**2,227.00**	1
ACZA	AM	2,214.00											**2,214.00**	1
Manganese	F			2,146.64									**2,146.64**	1
Pyrazon	H	15.50	1,204.86		764		28.81	83.61					**2,096.78**	5
Nicotine	I	2,029.00	27.47										**2,056.47**	2
Ferric dimethyldithiocarbamate	F				1,944								**1,944.00**	1
Safer's Insecticidal Soap	I		1,941.63										**1,941.63**	1
Cyhalothrin-Lambda	I	87.90	1,097.90	432.73	271		17.34	3.15					**1,910.01**	6
Florasulam	H	116.00		1,711.14									**1,827.14**	2
Ferrous Sulphate	H		1,818.73										**1,818.73**	1
Quinclorac	H	301.00	1,459.43										**1,760.43**	2
Pirimicarb	I	515.00	154.11		642		17.00	143.38		0.03			**1,471.51**	6
Tall oil fatty acids	A		1,470.36										**1,470.36**	1
Asphalt solids	F		1,387.47					34.30			0.48		**1,422.25**	3
Naphthalene	G		1,371.59			5					0.00		**1,371.59**	3
Fenhexamid	F	1,039.00			290			15.50					**1,344.50**	3
Daminozide	G	1,107.00	147.48					85.85					**1,340.33**	3
Monolinuron	H	1,256.00					80.00						**1,336.00**	2
Fenoxaprop-ethyl	H		117.87		1,215								**1,332.87**	2
Deltamethrin	I	71.20	775.11	386.37			11.78	15.35					**1,259.80**	5
Flusilazole	F	18.10			1,187			6.00					**1,211.10**	3
Piperonyl butoxide	I	207.00	591.58				3.91	3.62		342.74	0.21	0.08	**1,149.14**	7

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Flamprop-m-Methyl	H		1,091.48										**1,091.48**	1
Kresoxim-methyl	F	358.00			652			61.88					**1,071.88**	3
Dicofol	I	617.00	423.59				7.40	11.34					**1,059.33**	4
Chlorpropham	H	315.00	679.84				6.72	39.20					**1,040.76**	4
Clomazone	H				1,029								**1,029.00**	1
Metsulfuron-Methyl	H	62.90	938.62	13.52									**1,015.04**	3
Chlormequat	G	683.00	62.30				202.40	47.14					**994.85**	4
Chloroneb	F	412.00	559.27										**971.27**	2
Pyridaben	I	244.00	17.14		593			104.79					**958.93**	4
Sodium Hypochlorite	F	912.00											**912.00**	1
Vegetable Oil	A		874.03										**874.03**	1
Carbathion	F						839.16						**839.16**	1
Chlorthal dimethyl	H				453			367.50					**820.50**	2
other herbicide	H				778								**778.00**	1
Metaldehyde	M	266.00	476.51					22.20					**764.71**	3
Boric Acid	I	439.00	322.67										**761.67**	2
Parathion	I	203.00	23.91		211		288.00	9.60					**735.51**	5
Oxamyl	I	698.00	9.60				2.64						**710.24**	3
Dodine	F	14.30	13.00		577		94.90	7.80					**707.00**	5
Sulfosulfuron	H	16.40		677.19									**693.59**	2
Oxadiazon	H	649.00	41.20				0.91	1.60					**692.71**	4
Monochlorobenzene	H							661.20					**661.20**	1

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other insecticide	I				655								**655.00**	1
Methidathion	I		580.80					4.80					**585.60**	2
Bensulfide	H	24.30	212.56		330								**566.86**	3
Endothall	H		511.00										**511.00**	1
Triasulfuron	H	0.94	505.00										**505.94**	2
Triazole	F							502.50					**502.50**	1
Fenbutatin Oxide	I	478.00	12.38										**490.38**	2
Pyridate	H		486.00					0.00					**486.00**	2
Zoxamide	F	272.00		200.69									**472.69**	2
Oxydemeton-Methyl	I		469.49				0.24						**469.73**	2
Tebufenozide	I	443.00						25.92					**468.92**	2
Propyzamide	H	121.00	272.00				13.60	54.32					**460.92**	4
Fluroxypyr 1-Methylheptyl	I	457.00											**457.00**	1
Antimycin	I				440								**440.00**	1
Potassium Peroxymonosulfate Sulfate	AM	440.00											**440.00**	1
Dichlorvos	I	31.30	335.21					40.65					**407.16**	3
other fungicide	F				405								**405.00**	1
Etridiazole	H	187.00	210.63					5.09		0.50			**403.22**	4
Chlorsulfuron	H		66.68	335.66									**402.34**	2
Oxyfluorfen	H	209.00	27.42				137.66	24.80					**398.88**	4
Spinosad	I	328.00		52.80									**380.80**	2
Dodemorph-Acetate	F	289.00	55.20					34.44					**378.64**	3

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001) *	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Fonofos	I	12.00	330.00										**342.00**	2
Zinc	AM			271.91				63.36					**335.27**	2
Cyprodinil	F	325.00											**325.00**	1
Abamectin	I	318.00	3.63					1.44					**323.07**	3
Fenthion	I	8.06	293.64				2.47	0.10					**304.27**	4
Primisulfuron-methyl	H				285								**285.00**	1
Pyrethrins	I	38.30	178.18				0.91	1.14		61.64	0.07	0.05	**280.28**	7
Aciflurofen	H				262								**262.00**	1
Fenbuconazole	F	36.60			217								**253.60**	2
Hydrogen Peroxide	AM	250.00											**250.00**	1
Propoxur	I	44.20	169.98					18.72		2.88			**235.78**	4
Oxine Benzoate	F	172.00	59.08					2.30			0.00		**233.39**	4
Zinc Phosphide	Ro	125.00	49.22				25.20	26.80		0.17		0.76	**227.15**	6
Borax, All Forms	I		218.79								0.02		**218.82**	2
Oxycarboxin	F	48.50	154.13				5.25	3.00		6.40			**217.28**	5
Imazapyr	H		200.64							14.40			**215.04**	2
Strychnine	Ro	47.00	163.20										**210.20**	2
Cymoxanil	F	193.00		2.76				1.08					**196.84**	3
Rotenone	I	3.42	179.97				0.28	0.08			2.22		**185.97**	5
N-Octyl Bicycloheptene Dicarboximide	I	38.10	144.54				1.42	0.73					**184.78**	4
4-(cyclopropyl-alpha-hydroxy-methylene)-3,5-dioxo-cyclohexane	G	178.00						2.14					**180.14**	2

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Triadimenol	F		178.04										**178.04**	1
Butylate	H		176.00										**176.00**	1
Chlorthal	H	82.50	12.95					70.50					**165.95**	3
Copper sulphate (tribasic)	F		159.62										**159.62**	1
Dimethomorph	F	22.50	72.90				56.70						**152.10**	3
Copper Triethanolamine Complex	F		145.18										**145.18**	1
Methoxychlor	I	34.10	109.90										**144.00**	2
Diphenylamine	F						24.32	119.20					**143.52**	2
Surfactant Mixture	A	142.00											**142.00**	1
2-(Hydroxymethyl)-2-Nitro-1,3-Propanediol	AM	23.60						108.60					**132.20**	2
Monosodium Methane Arsonate	H	128.00	3.84										**131.84**	2
Sulfotep	I		128.11										**128.11**	1
N-Alkyl (40% C12, 50% C14, 10% C16) Dimethyl Benzyl Ammonium Chloride	AM	8.57					81.40	35.50					**125.47**	3
Copper naphtenate	AM		123.18								1.21		**124.40**	2
Bendiocarb	I	60.70	59.28							0.45		0.38	**120.80**	4
Acetamiprid	I	119.00						1.67					**120.67**	2
Lindane (Gamma-BHC)	I						0.35	114.07					**114.42**	2
Diflubenzuron	I	1.63						0.50		104.75			**106.88**	3
Tebuthiuron	H		3.15					93.60					**96.75**	2

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Polymerized Butenes	Ro		92.94										**92.94**	1
Kinoprene	I	57.90	33.61					0.59					**92.10**	3
Cyromazine	I	88.80						0.34					**89.14**	2
Tetrachlorvinphos	I	6.85	52.01					29.00					**87.86**	3
1,2-Ethanediol	A		87.00										**87.00**	1
Potassium monpersulfate	F		15.02					67.41					**82.43**	2
1-bromo-3-chloro-5,5-dimethylhydantoin	AM	61.00	20.46										**81.46**	2
Naphthalene Acetic Acid	G	79.30					0.52	1.14					**80.96**	3
Pymetrozine	I	73.10						2.10					**75.20**	2
Difenoconazole	F	71.50											**71.50**	1
Paradichlorobenzene	R		65.34			20							**65.34**	2
Arsenic	AM						59.28						**59.28**	1
Methyl-3-(4-methyl-6methyl-1,,3,5-trizin-z)methom	H						58.46						**58.46**	1
N-alkyl dimethyl benzyl ammonium chloride	AM		56.44										**56.44**	1
Sodium Chlorite	F		54.02										**54.02**	1
other growth regulator	G				53								**53.00**	1
N-alkyl polyethoxyethanol	A		52.50										**52.50**	1
Methyl nonyl ketone	Ro		50.03								0.09		**50.12**	2
Cyfluthrin	I	44.00	1.27							4.82			**50.09**	3
Dichloran	F	48.90											**48.90**	1

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Dienochlor	I		48.80										**48.80**	1
6-Benzylaminopurine (or: 6-Benzyladenine)	G	47.70						0.20					**47.90**	2
Clofentezine	I	42.10						5.68					**47.78**	2
Isoxaben	H	47.70											**47.70**	1
Coumaphos	I	0.99	45.62				0.06						**46.67**	3
Zinc naphtenate	AM		40.00								6.10		**46.10**	2
Formetanate Hydrochloride	I							45.54					**45.54**	1
Acetic Acid	H	37.50						2.50					**40.00**	2
Fatty acids	G		34.62								0.60		**35.22**	2
N-alkyl diethanolamine	A		33.60										**33.60**	1
Methoprene	I	16.10						1.68		14.36			**32.14**	3
Ethion	I		32.10										**32.10**	1
N-Alkyl (67% C12, 25% C14, 7% C16, 1% C18) Dimethyl Benzyl Ammonium Chloride	AM	3.72						27.72					**31.44**	2
Propetamphos	I	31.20								0.11			**31.31**	2
Aminoethoxyvinyl clycine	G	20.80						9.94					**30.74**	2
Potassium salts of fatty acids	I/H/F	27.20									0.25	0.05	**27.51**	3
Methyl Anthranilate	R	26.10											**26.10**	1
O-Phenylphenol	AM	19.80	0.22					5.59					**25.61**	3
Water Soluble Dyes	H	18.70	5.14										**23.84**	2

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
D-trans allethrin	I	1.54	20.70										**22.24**	2
O-Benzyl-P-Chlorophenol	AM	17.20						4.99					**22.19**	2
(E,E)-8,10-Dodecadien-1-Ol + 1-Dodecanol + 1-Tetradecanol	I	20.10											**20.10**	1
Polyphenylene isooctylphenyl	A							18.20					**18.20**	1
Disulfoton	I						18.00						**18.00**	1
Dried Blood	R	18.00											**18.00**	1
Tau Fluvinate	I			16.45									**16.45**	1
Streptomycin	F	14.00	2.12										**16.12**	2
Amitraz	I	14.60											**14.60**	1
Naptalam	H	2.40	4.80				2.40	4.80					**14.40**	4
Tetramethrin	I		14.20										**14.20**	1
Natural gum resins	I		8.99							5.00			**13.99**	2
Gibberellins	G	13.80											**13.80**	1
Copper 8-quinolinolate	F		13.62										**13.62**	1
Poly[Oxyethylene(Dimethyliminio)Ethylene(Dimethyliminio)Ethylene Dichlo	A	13.50											**13.50**	1
Hydramethylnon	I	2.91	9.17							0.09			**12.17**	3
Fluazifop-butyl	H		12.00										**12.00**	1
Oil of black pepper	Ro		11.97										**11.97**	1
Chinomethionat	F	5.00	6.50										**11.50**	2
Gibberellic Acid	G	9.42	0.57					0.27					**10.25**	3

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Azamethiphos	I						8.35	0.12					**8.47**	2
Di-N-Propyl Isocinchomeronate	I	1.63	6.42				0.16					0.07	**8.28**	4
(Z,Z)-3, 13-Octadecadienyl Acetate	I	7.77											**7.77**	1
Putrescent whole egg solids	R		7.40										**7.40**	1
N-alkyl (5% C12) dimethyl benzyl ammonium chloride	AM		7.27										**7.27**	1
Alkylphenol ethoxylate	A							7.20					**7.20**	1
Fenvalerate	F	0.64	4.06				1.85						**6.55**	3
Naphthaleneacetamide	G	4.71						1.32					**6.03**	2
Brassica Hirta White Mustard Seed Powder	Ro	5.66											**5.66**	1
P-Tert Amyl Phenol	AM	3.81						1.03					**4.84**	2
Polybutene	R									4.69			**4.69**	1
Artificial Essential Oil Blend			4.46										**4.46**	1
Butoxypolypropylene glycol	I		2.28									2.00	**4.28**	2
Chlofentizine	I						0.47	3.54					**4.01**	2
Sodium Alpha-Olefin Sulfonate	Ro	3.59											**3.59**	1
Paclobutrazol	G	1.90						1.68					**3.58**	2
B.t. ssp. tenebrionis	I	2.88											**2.88**	1
Fluvalinate	H	2.75											**2.75**	1
Streptomyces griseoviridis Strain K61	F	2.21											**2.21**	1

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Blend of Oils	A		2.12										**2.12**	1
Bromadiolone	Ro	0.53	1.21				0.00	0.01		0.05	0.27	0.02	**2.09**	7
Dithiopyr	H		2.07										**2.07**	1
Allethrin	I		2.05								0.00		**2.06**	2
Anilazine	F	1.00	1.00										**2.00**	2
Chlorophacinone	Ro	0.13	1.77										**1.90**	2
Denatonium Benzoate	Ro	0.03	1.81										**1.83**	2
Warfarin	Ro		1.79										**1.79**	1
d-Cis, trans allethrin	I		1.65									0.00	**1.65**	2
Muscalure	I		0.59				0.96						**1.55**	2
2,2-dibromo-3-nitrilopropionamide	AM									1.51			**1.51**	1
4-Aminopyridine	Ro	0.01	1.49										**1.50**	2
Chloramben	H		1.44										**1.44**	1
Sulfaquinoxaline	Ro		1.42										**1.42**	1
Coal Tar Oils	AM		1.22										**1.22**	1
Ammonia			1.06										**1.06**	1
Abietivirus	I									1.00			**1.00**	1
Sodium fluosilicate	F		0.96										**0.96**	1
Benzyladenine	G							0.83					**0.83**	1
Polyacrylamide	A	0.61											**0.61**	1
Crotoxyphos	I							0.60					**0.60**	1
Triflusulfuron Methyl	H	0.59											**0.59**	1

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Brodifacoum	Ro	0.42	0.11				0.01	0.01		0.02	0.00		**0.57**	6
Diphacinone	Ro	0.15	0.37				0.00	0.02		0.01	0.01		**0.56**	6
Piperine	R		0.45										**0.45**	1
Sulphur suphide	F										0.43		**0.43**	1
Dichlone	F		0.43										**0.43**	1
Coal Tar Acids	AM		0.36										**0.36**	1
Triticonazole	F	0.29											**0.29**	1
Alkanolamine salts of fatty acids	G										0.23		**0.23**	1
Glycolic Acid	H							0.23					**0.23**	1
Uniconazole-p	G	0.18						0.03					**0.21**	2
Lemon grass	R										0.19		**0.19**	1
Cholecalciferol	Ro	0.08	0.10							0.00			**0.19**	3
(Z)-11-Tetradecenyl Acetate (Or: Cis-11-Tetradecen-1-Yl) Acetate)	I	0.18											**0.18**	1
Ancymidol	G	0.09	0.08					0.00					**0.16**	3
Tributyltin oxide	AM		0.13										**0.13**	1
Pyriproxyfen	I	0.11											**0.11**	1
Difethialone	Ro	0.08						0.01		0.00			**0.09**	3
(Z)-9-Tricosene	I	0.08						0.01					**0.09**	2
Capsaicin	Ro	0.09											**0.09**	1
Ferric Phosphate	M	0.08											**0.08**	1
Oleoresin capsicum	R		0.08										**0.08**	1

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Ergocalciferol	Ro		0.02										**0.02**	1
N-alkyl (50% C12) dimethyl ethylbenzyl ammonium chloride	AM		0.01										**0.01**	1
Ammonia soaps	R										0.01		**0.01**	1
Benzyidiethyl	R										0.01		**0.01**	1
S-methoprene	I									0.01			**0.01**	1
Bromethalin	Ro	0.01											**0.01**	1
Mustard oil	Ro										0.00		**0.00**	1
4-CPA	G		0.00										**0.00**	1
2-(Thiocyanomethylthio)Benzothiazole (TCMTB)	AM												**0.00**	0
2,4-Xylenol (or 2,4-Dimethylphenol)	F												**0.00**	0
2-Chloro-N-[(4-Methoxy-6-Methyl-1,3,5-Triazin-2 Yl)Aminocarbonyl]Benzene Sulfonamide	H												**0.00**	0
Dinoseb	H												**0.00**	0
Flamprop-Methyl	H												**0.00**	0
M-Cresol	F												**0.00**	0
Methiocarb	I												**0.00**	0
Paraformaldehyde	AM												**0.00**	0
Pheromone	I												**0.00**	0

Pesticide	Pesticide Type	B.C. (2003)	Alta. (1998)	Man. (2003)	Ont. (2003)**	Que. (2001)*	N.B. (2003)	N.S. (2003)**	P.E.I. (2002)	N.L. (2003)	Y.T. (1994)	N.W.T. (1995)	TOTAL (Kg)	Count (/11 P/T)
Codling Moth														
Propargite	I												0.00	0
Tribasic Copper Sulphate	F												0.00	0
TOTAL		4,666,710.68	9,300,507.58	3 ,053,082.32	4,214,723.00	3,276,257	781,922.67	441,608.63	316,987	42,400.33	9626.36	2044.16	26,105,869.72	

Legend

A = adjuvant D = anti-microbial H = herbicide I = insecticide M = molluscicide N = nematocide R = repellent

Data for Saskatchewan are not available.

*Due to Quebec's reporting format, its data are not comparable to those of the other provinces. As such, only the ranks for the top 20 pesticides sold in the province in 2001 are presented. (See section 7.2 for explanations of Quebec's data presentation).

** MCPA values include MCPB

[1] The number of provinces who reported use of the pesticide

As of 2001, the use of lindane and parathion was discontinued in Canada.

Appendix 3: British Colombia

Source: ENKON Environmental Limited, 2005

Table 34: Total quantities (kg) of pesticide active ingredients sold or used in British Columbia in 2003 (excluding domestic pesticides)

Active Ingredient	Pesticide Type	Quantity Sold/Used (kg)	Proportion (%)
Creosote	**Anti-microbial**	**2,163,142.00**	**46.35**
CCA	**Anti-microbial**	**824,100.00**	**17.66**
Mineral Oil	**Insecticidal or adjuvant**	**317,108.00**	**6.80**
Didecyl Dimethyl Ammonium Chloride	**Anti-microbial**	**174,635.00**	**3.74**
Pentachlorophenol	**Anti-microbial**	**147,684.00**	**3.16**
Glyphosate	**Herbicide**	**126,269.00**	**2.71**
B.t. Berliner ssp kurstaki	**Insecticide**	**85,765.00**	**1.84**
ACQ	**Anti-microbial**	**74,448.00**	**1.60**
Sulphur	**Fungicide**	**73,408.00**	**1.57**
Disodium Octaborate Tetrahydrate	Anti-microbial	40,281.00	0.86
B.t. Serotype H-14	Insecticide	39,153.00	0.84
Mancozeb	Fungicide	34,888.00	0.75
Chlorothalonil	Fungicide	33,505.00	0.72
Metam	Fumigant	28,582.00	0.61
Diazinon	Insecticide	27,074.00	0.58
Captan	Fungicide	25,500.00	0.55
MCPA	Herbicide	23,598.00	0.51
Mineral Oil	Herbicide	23,575.00	0.51
Formaldehyde	Anti-microbial	21,822.00	0.47
Lime Sulphur	Fungicide	20,524.00	0.44
Copper Oxychloride	Fungicide	19,562.00	0.42
Methyl Bromide	Fumigant	18,808.00	0.40
2,4-D	Herbicide	18,543.00	0.40
Metiram	Fungicide	15,293.00	0.33
Carbaryl	Insecticide	12,363.00	0.26
Iodocarb	Fungicide	11,822.00	0.25
Atrazine	Herbicide	11,535.00	0.25
Quintozene	Fungicide	8,848.00	0.19
Nonylphenoxypolyethoxyethanol	Adjuvant/surfactant	8,781.00	0.19
Simazine	Herbicide	8,680.00	0.19
Dazomet	Fumigant	8,179.00	0.18
Fosetyl-Al	Fungicide	8,088.00	0.17
Surfactant Blend	Adjuvant/surfactant	7,498.00	0.16
Petroleum Hydrocarbon Blend	Adjuvant/surfactant	7,232.00	0.15
Soap	Insecticide	6,846.00	0.15
Dichlobenil	Herbicide	6,645.00	0.14
Azinphos-Methyl	Insecticide	6,499.00	0.14
Propiconazole	Fungicide	5,481.00	0.12
Paraquat	Herbicide	5,418.00	0.12
Napropamide	Herbicide	5,361.00	0.11
Paraffin Base Mineral Oil	Adjuvant/surfactant	4,952.00	0.11

Active Ingredient	Pesticide Type	Quantity Sold/Used (kg)	Proportion (%)
Endosulfan	Insecticide	4,729.00	0.10
Malathion	Insecticide	4,658.00	0.10
Linuron	Herbicide	4,639.00	0.10
Chlorpyrifos	Insecticide	4,561.00	0.10
Mecoprop	Herbicide	4,417.00	0.09
Iprodione	Fungicide	4,416.00	0.09
Dimethoate	Insecticide	4,155.00	0.09
Azoxystrobin	Fungicide	3,918.00	0.08
S-Metolachlor	Herbicide	3,892.00	0.08
Dicamba	Herbicide	3,627.00	0.08
Copper Hydroxide	Fungicide	3,524.00	0.08
Trifluralin	Herbicide	3,408.00	0.07
Benomyl	Fungicide	3,259.00	0.07
Terbufos	Insecticide	3,210.00	0.07
Octylphenoxypolyethoxyethanol	Adjuvant/surfactant	3,133.00	0.07
Propamocarb Hydrochloride	Fungicide	3,082.00	0.07
Bromoxynil	Herbicide	2,990.00	0.06
Metalaxyl-M	Fungicide	2,504.00	0.05
Glufosinate Ammonium	Herbicide	2,330.00	0.05
Ferbam	Herbicide	2,284.00	0.05
Diquat	Herbicide	2,283.00	0.05
Triallate	Herbicide	2,248.00	0.05
Ziram	Fungicide	2,227.00	0.05
ACZA	Anti-microbial	2,214.00	0.05
Maleic Hydrazide	Growth regulator	2,210.00	0.05
Thiophanate-Methyl	Fungicide	2,171.00	0.05
Fludioxonil	Herbicide	2,112.00	0.05
Phosmet	Insecticide	2,088.00	0.04
Tralkoxydim	Herbicide	2,064.00	0.04
Pendimethalin	Herbicide	2,055.00	0.04
Nicotine	Insecticide	2,029.00	0.04
Phosalone	Insecticide	1,878.00	0.04
Triforine	Fungicide	1,841.00	0.04
Paraffin Base Petroleum Oil	Adjuvant/surfactant	1,839.00	0.04
Zineb	Fungicide	1,832.00	0.04
Bentazon	Herbicide	1,784.00	0.04
Imazamethabenz	Herbicide	1,760.00	0.04
Fluazifop-P-Butyl	Herbicide	1,621.00	0.03
Myclobutanil	Fungicide	1,613.00	0.03
Ethalfluralin	Herbicide	1,546.00	0.03
Naled	Insecticide	1,409.00	0.03
Clopyralid	Herbicide	1,321.00	0.03
Monolinuron	Herbicide	1,256.00	0.03
Carbathiin	Fungicide	1,244.00	0.03
Dichlorprop	Herbicide	1,131.00	0.02
Daminozide	Growth regulator	1,107.00	0.02
Thiram	Fungicide	1,098.00	0.02

Active Ingredient	Pesticide Type	Quantity Sold/Used (kg)	Proportion (%)
Fenhexamid	Fungicide	1,039.00	0.02
Chloropicrin	Fumigant	998.00	0.02
Acephate	Insecticide	985.00	0.02
Methamidophos	Insecticide	984.00	0.02
Fenoxaprop-p-ethyl	Herbicide	915.00	0.02
Sodium Hypochlorite	Fungicide	912.00	0.02
2,4-DB	Herbicide	882.00	0.02
Vinclozolin	Herbicide	852.00	0.02
Sethoxydim	Herbicide	815.00	0.02
Diuron	Herbicide	770.00	0.02
Permethrin	Insecticide	724.00	0.02
Ethephon	Fungicide	704.00	0.02
Oxamyl	Insecticide	698.00	0.01
Chlormequat	Growth regulator	683.00	0.01
Amitrole	Herbicide	670.00	0.01
Clodinafop-Propargyl	Herbicide	658.00	0.01
Oxadiazon	Herbicide	649.00	0.01
Dicofol	Insecticide	617.00	0.01
EPTC	Herbicide	600.00	0.01
Picloram	Herbicide	592.00	0.01
Soap	Herbicide	556.00	0.01
Terbacil	Herbicide	547.00	0.01
Imidacloprid	Insecticide	528.00	0.01
Polyoxyalkylated Alkyl Phosphate Ester	Adjuvant/surfactant	527.00	0.01
Pirimicarb	Insecticide	515.00	0.01
Carbofuran	Insecticide	484.00	0.01
Fenbutatin Oxide	Insecticide	478.00	0.01
Fluroxypyr 1-Methylheptyl	Insecticide	457.00	0.01
Siloxylated Polyether	Adjuvant/surfactant	450.00	0.01
Triclopyr	Insecticide	450.00	0.01
Tebufenozide	Insecticide	443.00	0.01
Potassium Peroxymonosulfate Sulfate	Anti-microbial	440.00	0.01
Boric Acid	Insecticide	439.00	0.01
Metalaxyl	Fungicide	418.00	0.01
Chloroneb	Fungicide	412.00	0.01
Thifensulfuron Methyl	Herbicide	395.00	0.01
Quizalofop P-Ethyl	Herbicide	380.00	0.01
Kresoxim-Methyl	Fungicide	358.00	0.01
Pyraclostrobin	Fungicide	347.00	0.01
Methomyl	Insecticide	338.00	0.01
Spinosad	Insecticide	328.00	0.01
Cyprodinil	Fungicide	325.00	0.01
Abamectin	Insecticide	318.00	0.01
Chlorpropham	Herbicide	315.00	0.01
Quinclorac	Herbicide	301.00	0.01
Prometryne Plus Related Active Triazines	Herbicide	294.00	0.01

Active Ingredient	Pesticide Type	Quantity Sold/Used (kg)	Proportion (%)
Dodemorph-Acetate	Fungicide	289.00	0.01
Zoxamide	Fungicide	272.00	0.01
Metaldehyde	Molluscicide	266.00	0.01
Hydrogen Peroxide	Anti-microbial	250.00	0.01
Lindane	Insecticide	249.00	0.01
Pyridaben	Insecticide	244.00	0.01
Tefluthrin	Insecticide	239.00	0.01
Oxyfluorfen	Herbicide	209.00	0.00
Piperonyl Butoxide	Insecticide	207.00	0.00
Parathion	Insecticide	203.00	0.00
Cypermethrin	Insecticide	199.00	0.00
Aluminum Phosphide	Insecticide	196.00	0.00
Cymoxanil	Fungicide	193.00	0.00
Metribuzin	Herbicide	188.00	0.00
Etridiazole	Herbicide	187.00	0.00
4-(Cyclopropyl-Alpha-Hydroxy-Methylene)-3,5-Dioxo-Cyclohexane	Growth regulator	178.00	0.00
Oxine Benzoate	Fungicide	172.00	0.00
Thiabendazole	Fungicide	153.00	0.00
Tribenuron Methyl	Herbicide	143.00	0.00
Surfactant Mixture	Adjuvant/surfactant	142.00	0.00
Clethodim	Herbicide	141.00	0.00
Hexazinone	Herbicide	131.00	0.00
Monosodium Methane Arsonate	Herbicide	128.00	0.00
Zinc Phosphide	Rodenticide	125.00	0.00
Propyzamide	Herbicide	121.00	0.00
Acetamiprid	Insecticide	119.00	0.00
Florasulam	Herbicide	116.00	0.00
Nicosulfuron	Herbicide	116.00	0.00
Flucarbazone	Herbicide	111.00	0.00
Cyanazine	Herbicide	96.00	0.00
Cyromazine	Insecticide	88.80	0.00
Cyhalothrin-Lambda	Insecticide	87.90	0.00
Chlorthal	Herbicide	82.50	0.00
Naphthalene Acetic Acid	Growth regulator	79.30	0.00
Pymetrozine	Insecticide	73.10	0.00
Difenoconazole	Fungicide	71.50	0.00
Deltamethrin	Insecticide	71.20	0.00
Imazethapyr	Herbicide	70.00	0.00
Metsulfuron-Methyl	Herbicide	62.90	0.00
Silica Aerogel	Insecticide	62.40	0.00
1-Bromo-3-Chloro-5,5-Dimethylhydantoin	Anti-microbial	61.00	0.00
Bendiocarb	Insecticide	60.70	0.00
Kinoprene	Insecticide	57.90	0.00
Isoxaflutole	Herbicide	56.40	0.00
Bromacil	Herbicide	55.00	0.00

Active Ingredient	Pesticide Type	Quantity Sold/Used (kg)	Proportion (%)
Dichloran	Fungicide	48.90	0.00
Oxycarboxin	Fungicide	48.50	0.00
6-Benzylaminopurine (Or: 6-Benzyladenine)	Growth regulator	47.70	0.00
Isoxaben	Herbicide	47.70	0.00
Strychnine	Rodenticide	47.00	0.00
Silicon Dioxide	Insecticide	46.50	0.00
Diclofop-Methyl	Herbicide	45.40	0.00
Propoxur	Insecticide	44.20	0.00
Cyfluthrin	Insecticide	44.00	0.00
Maneb	Fungicide	43.20	0.00
Clofentezine	Insecticide	42.10	0.00
Pyrethrins	Insecticide	38.30	0.00
N-Octyl Bicycloheptene Dicarboximide	Insecticide	38.10	0.00
Acetic Acid	Herbicide	37.50	0.00
Sodium Metaborate Tetrahydrate	Herbicide	37.50	0.00
Fenbuconazole	Fungicide	36.60	0.00
Methoxychlor	Insecticide	34.10	0.00
Copper Sulphate	Fungicide	32.50	0.00
Dichlorvos	Insecticide	31.30	0.00
Propetamphos	Insecticide	31.20	0.00
Desmedipham	Herbicide	30.00	0.00
Phenmedipham	Herbicide	30.00	0.00
Metolachlor	Herbicide	29.90	0.00
Potassium Salts of Fatty Acids	Insecticide/Herbicide/Fungicide	27.20	0.00
Ethametsulfuron-Methyl	Herbicide	26.80	0.00
Methyl Anthranilate	Repellent	26.10	0.00
Bensulide	Herbicide	24.30	0.00
2-(Hydroxymethyl)-2-Nitro-1,3-Propanediol	Anti-microbial	23.60	0.00
Dimethomorph	Fungicide	22.50	0.00
Aminoethoxyvinylglycine	Growth regulator	20.80	0.00
(E,E)-8,10-Dodecadien-1-Ol + 1-Dodecanol + 1-Tetradecanol	Insecticide	20.10	0.00
O-Phenylphenol	Anti-microbial	19.80	0.00
Imazamox	Herbicide	18.70	0.00
Water Soluble Dyes	Herbicide	18.70	0.00
Flusilazole	Fungicide	18.10	0.00
Dried Blood	Repellent	18.00	0.00
O-Benzyl-P-Chlorophenol	Anti-microbial	17.20	0.00
Sodium Chlorate	Herbicide	16.60	0.00
Sulfosulfuron	Herbicide	16.40	0.00
Methoprene	Insecticide	16.10	0.00
MCPB	Herbicide	15.80	0.00
Pyrazon	Herbicide	15.50	0.00

Active Ingredient	Pesticide Type	Quantity Sold/Used (kg)	Proportion (%)
Amitraz	Insecticide	14.60	0.00
Dodine	Fungicide	14.30	0.00
Streptomycin	Fungicide	14.00	0.00
Gibberellins	Growth regulator	13.80	0.00
Poly[Oxyethylene(Dimethyliminio)Ethylene(Dimethyliminio) Ethylene Dichlo	Adjuvant/surfactant	13.50	0.00
Fonofos	Insecticide	12.00	0.00
Gibberellic Acid	Growth regulator	9.42	0.00
N-Alkyl (40% C12, 50% C14, 10% C16) Dimethyl Benzyl Ammonium Chloride	Anti-microbial	8.57	0.00
Fenthion	Insecticide	8.06	0.00
(Z,Z)-3, 13-Octadecadienyl Acetate	Insecticide	7.77	0.00
Tetrachlorvinphos	Insecticide	6.85	0.00
Brassica Hirta White Mustard Seed Powder	Rodenticide	5.66	0.00
Rimsulfuron	Herbicide	5.27	0.00
Chinomethionat	Fungicide	5.00	0.00
Naphthaleneacetamide	Growth regulator	4.71	0.00
P-Tert Amyl Phenol	Anti-microbial	3.81	0.00
N-Alkyl (67% C12, 25% C14, 7% C16, 1% C18) Dimethyl Benzyl Ammonium Chloride	Anti-microbial	3.72	0.00
Sodium Alpha-Olefin Sulfonate	Rodenticide	3.59	0.00
Rotenone	Insecticide	3.42	0.00
Hydramethylnon	Insecticide	2.91	0.00
B.t. ssp. tenebrionis	Insecticide	2.88	0.00
Fluvalinate	Herbicide	2.75	0.00
Naptalam	Herbicide	2.40	0.00
Streptomyces griseoviridis Strain K61	Fungicide	2.21	0.00
Dinocap	Fungicide	2.19	0.00
Tebuconazole	Fungicide	1.92	0.00
Paclobutrazol	Growth regulator	1.90	0.00
Diflubenzuron	Insecticide	1.63	0.00
Di-N-Propyl Isocinchomeronate	Insecticide	1.63	0.00
D-Trans Allethrin	Insecticide	1.54	0.00
Trichlorfon	Rodenticide	1.28	0.00
Anilazine	Fungicide	1.00	0.00
Coumaphos	Insecticide	0.99	0.00
Triasulfuron	Herbicide	0.94	0.00
Fenvalerate	Fungicide	0.64	0.00
Polyacrylamide	Adjuvant/surfactant	0.61	0.00
Triflusulfuron Methyl	Herbicide	0.59	0.00
Bromadiolone	Rodenticide	0.53	0.00
Brodifacoum	Rodenticide	0.42	0.00

Active Ingredient	Pesticide Type	Quantity Sold/Used (kg)	Proportion (%)
Triticonazole	Fungicide	0.29	0.00
(Z)-11-Tetradecenyl Acetate (Or: Cis-11-Tetradecen-1-Yl) Acetate)	Insecticide	0.18	0.00
Uniconazole-P	Growth regulator	0.18	0.00
Diphacinone	Rodenticide	0.15	0.00
Chlorophacinone	Rodenticide	0.13	0.00
Pyriproxyfen	Insecticide	0.11	0.00
Capsaicin	Rodenticide	0.09	0.00
Ancymidol	Growth regulator	0.09	0.00
Difethialone	Rodenticide	0.08	0.00
Cholecalciferol	Rodenticide	0.08	0.00
(Z)-9-Tricosene	Insecticide	0.08	0.00
Ferric Phosphate	Molluscicide	0.08	0.00
Denatonium Benzoate	Rodenticide	0.03	0.00
4-Aminopyridine	Rodenticide	0.01	0.00
Bromethalin	Rodenticide	0.01	0.00
TOTAL		**4,666,709.00**	**100.00**

As of 2001, the use of lindane and parathion was discontinued in Canada.

Appendix 4: Alberta

Source: Byrtus, G., 2000

Table 35: 1998 pesticide sales in Alberta. Top 10 are in **bold**.

Active Ingedient	Pesticide Type	Quantity Sold (kg)	Proportion (%)
Glyphosate	**Herbicide**	**2,682,748.86**	**28.85**
MCPA	**Herbicide**	**885,239.13**	**9.52**
2,4-D	**Herbicide**	**765,820.39**	**8.23**
Triallate	**Herbicide**	**693,178.48**	**7.45**
Surfactant Blend	**Adjuvant**	**496,561.74**	**5.34**
Ethalfluralin	**Herbicide**	**452,294.41**	**4.86**
Petroleum Hydrocarbon Blend	**Adjuvant**	**368,704.26**	**3.96**
Bromoxynil	**Herbicide**	**268,105.29**	**2.88**
Trifluralin	**Herbicide**	**230,028.22**	**2.47**
Chlorpyrifos	Insecticide	217,397.54	2.34
Paraffin Base Mineral Oil	Adjuvant	193,162.56	2.08
Imazamethabenz	Herbicide	173,679.21	1.87
Dicamba	Herbicide	138,278.65	1.49
Tralkoxydim	Herbicide	126,323.46	1.36
Carbathiin	Fungicide	122,292.00	1.31
Nonylphenoxypolyethoxyethanol	Adjuvant	94,247.33	1.01
Paraffin Base Petroleum Oil	Adjuvant	77,427.17	0.83
Ammonium Sulphate		71,104.45	0.76
Glufosinate Ammonium	Herbicide	63,863.79	0.69
Fenoxaprop-p-ethyl	Herbicide	59,919.01	0.64
Clopyralid	Herbicide	59,019.74	0.63
Sethoxydim	Herbicide	58,678.49	0.63
Lindane	Insecticide	56,743.67	0.61
Silicon Dioxide (sw fossils)	Insecticide	47,025.17	0.51
Mancozeb	Fungicide	45,813.94	0.49
Dichlorprop	Herbicide	40,942.40	0.44
EPTC	Herbicide	38,574.22	0.41
Chlorothalonil	Fungicide	37,333.96	0.40
Clodinafop-propargyl	Herbicide	34,408.89	0.37
Trichlorfon	Rodenticide	34,334.33	0.37
Triclopyr	Insecticide	30,311.81	0.33
B.t. Kurstaki	Insecticide	28,273.50	0.30
Mecoprop	Herbicide	27,264.09	0.29
Vinclozolin	Herbicide	25,823.10	0.28
Fluoroxypyr	Insecticide	23,700.75	0.25
Quizalofop-ethyl	Herbicide	23,101.02	0.25
Thiram	Fungicide	22,791.71	0.25
Malathion	Insecticide	22,316.45	0.24
Diquat	Herbicide	21,765.03	0.23
2,4-DB Esters	Herbicide	20,950.29	0.23
Phorate	Insecticide	19,209.00	0.21
Acrolein	Herbicide	17,520.48	0.19
Picloram	Herbicide	15,109.40	0.16
Metiram	Fungicide	14,862.40	0.16
Benomyl	Fungicide	14,616.34	0.16

Active Ingedient	Pesticide Type	Quantity Sold (kg)	Proportion (%)
Thifensulfuron methyl	Herbicide	13,697.52	0.15
Fluazifop-p-butyl	Herbicide	12,913.99	0.14
Ethofumesate	Herbicide	12,559.40	0.14
Bentazon	Herbicide	12,066.24	0.13
B.t. H-14	Insecticide	11,079.80	0.12
Silica Aerogel	Insecticide	11,052.49	0.12
Imazethapyr	Herbicide	10,528.55	0.11
Diuron	Herbicide	9,919.27	0.11
Quintozene	Fungicide	9,808.85	0.11
Iprodione	Fungicide	9,592.72	0.10
Difenzoquat	Herbicide	9,585.50	0.10
Polyoxyalkylated alkyl phosphate ester	Adjuvant	9,339.98	0.10
Octylphenoxypolyethoxyethanol	Adjuvant	9,218.96	0.10
Linuron	Herbicide	8,753.95	0.09
Maneb	Fungicide	8,462.01	0.09
Metribuzin	Herbicide	7,601.35	0.08
Sulfur-fungicide	Fungicide	7,315.44	0.08
Tribenuron-methyl	Herbicide	6,763.61	0.07
Terbufos	Insecticide	6,697.80	0.07
Carbofuran	Fungicide	6,413.38	0.07
Atrazine	Herbicide	5,753.81	0.06
Propiconazole	Fungicide	5,664.41	0.06
Dimethoate	Insecticide	4,883.44	0.05
Paraquat	Herbicide	4,820.41	0.05
Ethametsulfuron methyl	Herbicide	4,636.41	0.05
Metolachlor	Herbicide	4,297.85	0.05
Imazamox	Herbicide	4,231.83	0.05
Deet	Repellent	4,167.87	0.04
Diazinon	Insecticide	4,087.29	0.04
Cyanazine	Herbicide	3,891.60	0.04
Metalaxyl	Fungicide	3,796.19	0.04
Simazine	Herbicide	3,688.13	0.04
Mineral Oil	Insecticidal/Adjuvant	3,477.36	0.04
Tallow fatty acid	Growth Regulator	3,272.20	0.04
MCPB (Sodium salt)	Herbicide	3,271.50	0.04
Diclofop-methyl	Herbicide	3,239.92	0.03
Thiabendazole	Fungicide	3,187.22	0.03
Carbaryl	Insecticide	3,142.85	0.03
Bromacil	Herbicide	3,106.91	0.03
Quizalofop-p-ethyl	Herbicide	2,669.69	0.03
Clethodim	Herbicide	2,490.66	0.03
Hexazinone	Herbicide	2,428.14	0.03
Desmedipham	Herbicide	2,334.75	0.03
Phenmedipham	Herbicide	2,330.25	0.03
Cycloate	Herbicide	2,289.60	0.02
Aluminum Phosphide	Insecticide	2,215.71	0.02
Amitrole	Herbicide	2,026.47	0.02
Safer's Insecticidal Soap	Insecticide	1,941.63	0.02

Active Ingedient	Pesticide Type	Quantity Sold (kg)	Proportion (%)
Methyl Bromide	Soil fumigant	1,850.86	0.02
Ferrous Sulphate	Herbicide	1,818.73	0.02
Sodium metaborate tetrahydrate	Herbicide	1,616.28	0.02
Propanil	Herbicide	1,616.00	0.02
Tall oil fatty acids	Adjuvant	1,470.36	0.02
Quinclorac	Herbicide	1,459.43	0.02
Asphalt Solids	Fungicide	1,387.47	0.01
Naphthalene	Growth Regulator	1,371.59	0.01
Propamocarb Hydrochloride	Fungicide	1,271.25	0.01
Naled	Insecticide	1,257.89	0.01
Soap	Herbicide	1,221.52	0.01
Pyrazon	Herbicide	1,204.86	0.01
Cyhalothrin-Lambda	Insecticide	1,097.90	0.01
Flamprop-m-methyl	Herbicide	1,091.48	0.01
Pendimethalin	Herbicide	1,061.09	0.01
Sulphur	Rodenticide	1,045.34	0.01
Disodium octaborate tetrahydrate	Anti-microbial	1,033.53	0.01
Metsulfuron-methyl	Herbicide	938.62	0.01
Terbacil	Herbicide	891.20	0.01
Vegetable Oil	Adjuvant	874.03	0.01
Thiophanate-methyl	Fungicide	859.40	0.01
Creosote	Anti-microbial	805.16	0.01
Deltamethrin	Insecticide	775.11	0.01
Endosulfan	Insecticide	761.06	0.01
Sodium chlorate	Herbicide	729.15	0.01
Dichlobenil	Herbicide	728.23	0.01
Chlorpropham	Herbicide	679.84	0.01
Dazomet	Soil fumigant	627.20	0.01
Piperonyl butoxide	Insecticide	591.58	0.01
Methidathion	Insecticide	580.80	0.01
Chloroneb	Fungicide	559.27	0.01
Maleic Hydrazide	Growth Regulator	551.74	0.01
Endothall	Herbicide	511.00	0.01
Triasulfuron	Herbicide	505.00	0.01
Zineb	Fungicide	491.68	0.01
Pyridate	Herbicide	486.00	0.01
Metaldehyde	Molluscicide	476.51	0.01
Oxydemeton-methyl	Insecticide	469.49	0.01
Cypermethrin	Insecticide	439.63	0.00
Methomyl	Insecticide	434.53	0.00
Dicofol	Insecticide	423.59	0.00
Metam	Soil fumigant	410.67	0.00
Permethrin	Insecticide	397.24	0.00
Phosmet	Insecticide	370.00	0.00
Dichlorvos	Insecticide	335.21	0.00
Fonofos	Insecticide	330.00	0.00
Boracic Acid	Insecticide	322.67	0.00
Copper sulphate	Fungicide	316.09	0.00

Active Ingedient	Pesticide Type	Quantity Sold (kg)	Proportion (%)
Napropamide	Herbicide	294.55	0.00
Fenthion	Insecticide	293.64	0.00
Captan	Fungicide	286.84	0.00
Sulphur	Insecticide	280.74	0.00
Propyzamide	Herbicide	272.00	0.00
Azinphos-methyl	Insecticide	260.64	0.00
Acephate	Insecticide	257.59	0.00
Cupric hydroxide	Fungicide	252.50	0.00
Lime sulphur	Fungicide	223.98	0.00
Copper Oxychloride	Fungicide	220.19	0.00
Borax	Insecticide	218.79	0.00
Bensulfide	Herbicide	212.56	0.00
Etridiazole	Herbicide	210.63	0.00
Imazapyr	Herbicide	200.64	0.00
Rotenone	Insecticide	179.97	0.00
Pyrethrins	Insecticide	178.18	0.00
Triadimenol	Fungicide	178.04	0.00
Butylate	Herbicide	176.00	0.00
Propoxur	Insecticide	169.98	0.00
Nicosulfuron	Herbicide	166.65	0.00
Fosetyl-al	Fungicide	166.34	0.00
Strychnine	Rodenticide	163.20	0.00
Copper sulphate (tribasic)	Fungicide	159.62	0.00
Oxycarboxin	Fungicide	154.13	0.00
Pirimicarb	Insecticide	154.11	0.00
Daminozide	Growth Regulator	147.48	0.00
Copper triethanolamine	Fungicide	145.18	0.00
N-octyl bicycloheptene dicarboximide	Insecticide	144.54	0.00
Sulfotep	Insecticide	128.11	0.00
Copper naphenate	Anti-microbial	123.18	0.00
Didecyl dimethyl ammonium chloride	Anti-microbial	120.60	0.00
Fenoxaprop-ethyl	Herbicide	117.87	0.00
Methoxychlor	Insecticide	109.90	0.00
Formaldehyde	Fungicide	96.20	0.00
Polymerized butenes	Rodenticide	92.94	0.00
1,2-ethanediol	Adjuvant	87.00	0.00
Ferbam	Herbicide	77.61	0.00
Dimethomorph	Fungicide	72.90	0.00
Chlorsulfuron	Herbicide	66.68	0.00
Paradichlorobenzene	Repellent	65.34	0.00
Rimsulfuron	Herbicide	63.18	0.00
Chlormequat	Growth Regulator	62.30	0.00
Bendiocarb	Insecticide	59.28	0.00
Oxine Benzoate	Fungicide	59.08	0.00
N-alkyl dimethyl benzyl ammonium chloride	anti-microbial	56.44	0.00
Dodemorph-acetate	Fungicide	55.20	0.00

Active Ingedient	Pesticide Type	Quantity Sold (kg)	Proportion (%)
Folpet	Insecticide	54.81	0.00
Sodium chlorite	Fungicide	54.02	0.00
N-alkyl polyethoxyethanol	Adjuvant	52.50	0.00
Tetrachlorvinphos	Insecticide	52.01	0.00
Methyl Nonyl Ketone	Rodenticide	50.03	0.00
Zinc phosphide	Rodenticide	49.22	0.00
Dienochlor	Insecticide	48.80	0.00
Coumaphos	Insecticide	45.62	0.00
Oxadiazon	Herbicide	41.20	0.00
Zinc naphthenate	Anti-microbial	40.00	0.00
Fatty Acid	Growth Regulator	34.62	0.00
Kinoprene	Insecticide	33.61	0.00
N-alkyl diethanolamine	Adjuvant	33.60	0.00
Ethion	Insecticide	32.10	0.00
Ethephon	Fungicide	31.20	0.00
Nicotine	Insecticide	27.47	0.00
Oxyfluorfen	Herbicide	27.42	0.00
Parathion	Insecticide	23.91	0.00
D-trans allethrin	Insecticide	20.70	0.00
Triforine	Fungicide	20.62	0.00
1-bromo-3-chloro-5,5-dimethylhydantoin	Anti-microbial	20.46	0.00
Methamidophos	Insecticide	19.20	0.00
Pyridaben	Insecticide	17.14	0.00
Myclobutanil	Fungicide	16.80	0.00
Potassium monopersulphate	Anti-microbial	15.02	0.00
Tetramethrin	Insecticide	14.20	0.00
Copper 8-quinolinolate	Fungicide	13.62	0.00
Dodine	Fungicide	13.00	0.00
Chlorthal	Herbicide	12.95	0.00
Fenabutatin Oxide	Insecticide	12.38	0.00
Fluazifop-butyl	Herbicide	12.00	0.00
Oil of black pepper	Rodenticide	11.97	0.00
Ammonium sulphamate	Herbicide	10.43	0.00
Oxamyl	Insecticide	9.60	0.00
Imidacloprid	Insecticide	9.54	0.00
Hydramethylnon	Insecticide	9.17	0.00
Natural gum resins	Insecticide	8.99	0.00
Putrescent whole egg solids	Repellent	7.40	0.00
N-alkyl (5% C12) dimethyl benzyl ammonium chloride	Anti-microbial	7.27	0.00
Chinomethionat	Fungicide	6.50	0.00
Di-n-propyl isocinchomeronate	Insecticide	6.42	0.00
Phosalone	Insecticide	5.62	0.00
Water soluble dyes	Herbicide	5.14	0.00
Naptalam	Herbicide	4.80	0.00
Artificial Essential Oil Blend		4.46	0.00
Fenvalerate	Fungicide	4.06	0.00
Monosodium methane arsenate	Herbicide	3.84	0.00

Active Ingedient	Pesticide Type	Quantity Sold (kg)	Proportion (%)
Abamectin	Insecticide	3.63	0.00
Tebuthiuron	Herbicide	3.15	0.00
Resmethrin	Herbicide	2.37	0.00
Butoxypolypropylene glycol	Insecticide	2.28	0.00
Blend of Oils		2.12	0.00
Streptomycin	Fungicide	2.12	0.00
Dithiopyr	Herbicide	2.07	0.00
Allethrin	Insecticide	2.05	0.00
Denatonium Benzoate	Rodenticide	1.81	0.00
Warfarin	Rodenticide	1.79	0.00
Chlorophacinone	Rodenticide	1.77	0.00
D-cis, trans allethrin	Insecticide	1.65	0.00
4-Aminopyridine	Rodenticide	1.49	0.00
Chloramben	Fungicide	1.44	0.00
Sulfaquinoxaline	Rodenticide	1.42	0.00
Cyfluthrin	Insecticide	1.27	0.00
Coal Tar Oils	Anti-microbial	1.22	0.00
Bromadiolone	Rodenticide	1.21	0.00
Ammonia		1.06	0.00
Anilazine	Fungicide	1.00	0.00
Sodium fluosilicate	Fungicide	0.96	0.00
Muscalure	Insecticide	0.59	0.00
Gibberellic Acid	Growth Regulator	0.57	0.00
Piperine	Repellent	0.45	0.00
Dichlone	Fungicide	0.43	0.00
Diphacinone	Rodenticide	0.37	0.00
Coal Tar Acids	Anti-microbial	0.36	0.00
o-phenylphenol	anti-microbial	0.22	0.00
Tributyltin oxide	Anti-microbial	0.13	0.00
Brodifacoum	Rodenticide	0.11	0.00
Cholecalciferol	Rodenticide	0.10	0.00
Ancymidol	Growth Regulator	0.08	0.00
Oleoresin capsicum	Repellent	0.08	0.00
Ergocalciferol	Rodenticide	0.02	0.00
N-alkyl (50% C12) dimethyl ethylbenzyl ammonium chloride	Anti-microbial	0.01	0.00
4-CPA	Growth Regulator	0.00	0.00
TOTAL		**9,300,507.58**	**100.00**

As of 2001, the use of lindane and parathion was discontinued in Canada.

Appendix 5: Saskatchewan

Table 36: Pesticide use in Saskatchewan based on a study of 21 farms in 11 regions of Saskatchewan (Source: Donald, D *et al.*, 2001).

Herbicide	Trade names or formulations used	% Total Use
Herbicides analyzed		
MCPA	MCPA, Dyvel, Bucktrell-M	18.4
2,4-Dichlorophenoxyacetic acid	2,4-D	11.6
Bromoxynil	Laser, How-Grass II, Parder	8.2
Dicamba	Target, Dyvel, Banvel	4.7
Imazamethabenz	Assert	3.4
Mecoprop	Mecoprop, Target	3.4
Dichlorprop	Estaprop	1.4
Trifluralin	Trifluralin, Treflan, Rival	1.4
Triallate	Fortress, Avadex	0
Dichlofop-methyl	How-Grass	0
Herbicides not analyzed		
Fenozaprop-ethyl		5.4
Imazethapyr	Laser, Puma, Triumph	5.4
Thifensulfuron	Pursuit	4.7
Tralkozydim	Refine	4.1
Sethoxydim	Achieve, Prevail	4.1
Tribenuron	Poast	3.4
Glyphosate	Refine	3.4
Ethalfurlin	Laredo, Roundup, Rustler	2.7
Cladinafop-propargyl	Edge	2
Glusosinate	Horizon	2
Fluazifop-butyl	Harvest	2
Clopyralid	Fusilade II	2
Metribuzin	Prevail, Lontrel	1.4
Flurozypyr	Lexone DF, Sencor	1.4
Ethametsulfuro *n*-ethyl		1.4
Clethodim	Select	1.4
Quizalofop-ethyl	Assure	0.7
Total		100

Table 37: Relative use of pesticides in Saskatchewan in 1996. Data from Donald, D. *et al.* 1999

	Relative use 1996 (%)*
Herbicides	
2,4-D	37
MCPA	28
Bromoxynil	12
Triallate	8
Dicamba	6
Dichlorprop	3
Trifluralin	3
MCPB	2
Diclofop-methyl	1
2,4-DB	<1

*Relative use is based on a survey of pesticide container collection depots near study regions

Appendix 6: Manitoba

Source: Manitoba Crop Insurance Corporation, 2003.

Table 38: Pesticide active ingredients used in Manitoba in 2003. Top 10 are in **bold.**

Pesticide	Type	Quantity Used (kg a.i.)	Proportion (%)
2,4-D	**Herbicide**	**609,004.71**	**17.01**
Flucarbazone	**Herbicide**	**507,180.88**	**14.96**
Glyphosate	**Herbicide**	**479,726.13**	**13.40**
MCPA/MCPB	**Herbicide**	**446,937.17**	**12.48**
Bromoxynil	**Herbicide**	**191,936.39**	**5.36**
Ethalfluralin	**Herbicide**	**144,201.08**	**4.03**
Glufosinate ammonium	**Herbicide**	**124,972.38**	**3.49**
Iprodione	**Fungicide**	**112,603.34**	**3.14**
Bentazon	**Herbicide**	**81,837.41**	**2.29**
Mancozeb	**Fungicide**	**70,231.05**	**1.96**
Trifluralin	Herbicide	65,382.51	1.83
Imazamethabenz	Herbicide	63,708.65	1.78
Vinclozin	Herbicide	62,763.89	1.75
Dichlorprop	Herbicide	60,759.30	1.70
Carbaryl	Insecticide	49,295.51	1.38
Propiconazole	Fungicide	46,164.89	1.29
Fenoxaprop-p-ethy	Herbicide	38,899.91	1.09
Atrazine	Herbicide	31,411.49	0.88
Chlorothalonil	Fungicide	30,710.87	0.86
Sethoxydim	Herbicide	28,158.54	0.79
Clodinafop-propargyl	Herbicide	25,868.48	0.72
Tebuconazole	Fungicide	24,900.88	0.70
Tralkoxydim	Herbicide	22,920.02	0.64
Chlorpyrifos	Insecticide	20,854.47	0.58
Clopyralid	Herbicide	17,086.04	0.48
Clethodim	Herbicide	16,649.22	0.46
Fluroxypyr	Herbicide	16,499.46	0.46
Difenzoquat	Herbicide	16,146.35	0.45
Metribuzin	Herbicide	15,974.94	0.45
Dicamba	Herbicide	15,899.63	0.44
Linuron	Herbicide	12,812.05	0.36
Triallate	Herbicide	12,129.48	0.34
EPTC	Herbicide	10,054.77	0.28
Metiram	Fungicide	9,600.77	0.27
Mecoprop	Herbicide	8,657.53	0.24
Ethylene bisdithiocarbamate	Fungicide	8,314.66	0.23
Diquat	Herbicide	6,393.99	0.18
Carbofuran	Insecticide	6,186.10	0.17
Imidacloprid	Insecticide	5,938.67	0.17
Imazethapyr	Herbicide	5,005.61	0.14
Dimethoate	Insecticide	4,502.97	0.13
Propanil	Herbicide	4,280.36	0.12
Azinphos-methyl	Insecticide	3,512.42	0.10
Hexazinone	Herbicide	3,245.02	0.09
Paraquat	Herbicide	3,206.58	0.09

Pesticide	Type	Quantity Used (kg a.i.)	Proportion (%)
Imazamox	Herbicide	3,199.90	0.09
Thifensulfuron methyl	Herbicide	2,965.03	0.08
Amitrole	Herbicide	2,645.55	0.07
Phorate	Insecticide	2,398.74	0.07
Manganese	Fungicide	2,146.64	0.06
2,4-DB	Herbicide	2,123.63	0.06
metalaxyl-m	Fungicide	2,092.86	0.06
Pyraclostrobin	Fungicide	2,059.25	0.06
Endosulfan	Insecticide	1,823.00	0.05
Nicosulfuron	Herbicide	1,748.40	0.05
Florasulam	Herbicide	1,711.14	0.05
Ethametsulfuron-methyl	Herbicide	1,593.48	0.04
Fluazifop-p-butyl	Herbicide	1,537.36	0.04
Azoxystrobin	Herbicide	1,276.30	0.04
Tribenuron methyl	Herbicide	1,198.77	0.03
Malathion	Insecticide	1,104.63	0.03
Rimsulfuron	Herbicide	1,050.56	0.03
Quizalofop P-Ethyl	Herbicide	1,021.02	0.03
Copper Hydroxide	Fungicide	771.41	0.02
Sulfosulfuron	Herbicide	677.19	0.02
Cyhalothrin-Lambda	Insecticide	432.73	0.01
Methamidophos	Insecticide	417.86	0.01
Phosmet	Insecticide	401.00	0.01
Deltamethrin	Insecticide	386.37	0.01
Chlorsulfuron	Herbicide	335.66	0.01
Zinc	Fungicide	271.91	0.01
Zoxamide	Fungicide	200.69	0.01
Cypermethrin	Insecticide	194.49	0.01
Metalaxyl	Fungicide	137.27	0.00
Spinosad	Insecticide	52.80	0.00
Tau Fluvinate	Insecticide	16.45	0.00
Metsulfuron Methyl	Herbicide	13.52	0.00
Cymoxanil	Fungicide	2.76	0.00
Sulphur	Fungicide	1.18	0.00
TOTAL		**3,580,536.16**	**100.00**

Table 39: Pesticide use in Manitoba in 2003 by Trade Name

Trade Name	Active Ingredients	Application Rate (kg a.i./ha)	Area Applied to (ha)	Quantity Applied (kg a.i.)
2,4-D	2,4-D	1.47	46,230.88	67,959.40
2,4-D AMINE	2,4-D	0.86	15,463.85	26,667.87
2,4-D LVESTER	2,4-D	0.54	9779.6	5,281.00
AATREX	Atrazine	1.3584	3333.4	4,528.08
ACCENT	Nicosulfuron	0.03	43,287.77	1,084.36
ACHIEVE DG	Tralkoxydim	0.20	88,367.97	17,673.59
ACHIEVE EXTRA GOLD	Tralkoxydim	0.02	25074.3	501.49

Trade Name	Active Ingredients	Application Rate (kg a.i./ha)	Area Applied to (ha)	Quantity Applied (kg a.i.)
	Bromoxynil	0.28	25074.3	7,020.81
	MCPA	0.28	25074.3	7,020.81
	Imidacloprid	0.264	22495.0	5,938.67
ADVANCE	Trifluralin	1.43	1009.7	1,443.86
ALLY	Metsulfuron Methyl	0.00375	3605.3	13.52
AMITROL-T	Amitrole	2.09	1268.3	2,650.72
ASSERT	Imazamethabenz	0.45	140,886.00	63,708.65
ASSURE	Quizalofop P-Ethyl	0.05088	20278.4	1,031.76
ATRAZINE	Atrazine	1.26	21336.0	26,883.41
ATTAIN	2,4-D	0.56	116,338.42	65,614.87
	Fluroxypyr 1-Methylheptyl Ester	0.11	116,338.42	12,564.55
AVADEX BW	Triallate	1.58	5892.2	9,309.71
AVENGE	Difenzoquat	0.572	20915.0	11,963.36
BANVEL	Dicamba	0.12	55,345.42	6,892.72
BASAGRAN	Bentazon	0.95	86,246.32	81,837.41
BONANZA	Trifluralin	1.272	2597.7	3,304.25
BRAVO	Chlorthalonil	2.13	14452.2	30,783.13
BUCTRIL M	Bromoxynil	0.28	571,505.56	160,021.56
	MCPA	0.28	571,505.56	160,021.56
COBUTOX	2,4-DB	1.464	974.1	1,426.05
CURTAIL M	Clopyralid	0.10	66,327.77	6,632.78
	MCPA	0.56	66,327.77	37,143.55
CURZATE	Cymoxanil	0.00135	2044.8	2.76
DECIS	Deltamethrin	0.01	50,177.78	386.37
DICHLORPROP	Dichlorprop	0.525	25848.1	13,570.24
	2,4-D	0.4935	25848.1	12,756.03
DICHLORPROP-D	Dichlorprop	0.525	4344.3	2,280.76
DITHANE	Mancozeb	1.26	47,535.35	59,894.54
DYVEL DS	Dicamba	0.11	12006.3	1,320.69
	2.4-D	0.29	12006.3	3,481.81
	Mecoprop	0.08	12006.3	960.50
ECLIPSE	Clopyralid	0.04	5245.9	209.84
	Glyphosate	0.15	5245.9	786.89
EDGE	Ethalfluralin	1.25	115,360.86	144,201.08
EMBUTOX E	2,4-DB	1.25	558.1	697.58
EPTAM	EPTC	3.72	2702.9	10,054.77
ESTAPROP	Dichlorprop	0.53	80,444.22	42,233.22
	2,4-D	0.49	80,444.22	39,699.22
EVEREST	Flucarbazone	0.029	113,297.82	3,285.64
EXPRESS	Tribenuron methyl	0.0075	3364.4	25.23
EXPRESS PACK	Tribenuron methyl	0.0075	4648.2	34.86
FACTOR	Glyphosate	0.53	14014.3	7,427.56
FOLICUR	Tebuconazole	0.13	197,406.67	24,900.88
FORTRESS	Triallate	1.4	2014.1	2,819.77
	Trifluralin	0.56	2014.1	1,127.91

Trade Name	Active Ingredients	Application Rate (kg a.i./ha)	Area Applied to (ha)	Quantity Applied (kg a.i.)
FRONTLINE	Florasulam	0.01	314,868.17	1,574.34
	MCPA	0.35	314,868.17	110,203.86
FRONTLINE/2,4-D CO-PACK	2,4-D	1.47	855.1	1,257.00
	Florasulam	0.01	855.1	4.28
	MCPA	0.35	855.1	299.29
FURADAN	Carbofuran	0.28	22093.2	6,186.10
FUSION	fenoxaprop-p-ethy	0.04	11962.1	478.48
	fluazifop-p-butyl	0.1	11962.1	1,196.21
GAVEL	Mancozeb	1.38	1154.2	1,592.75
	Zoxamide	0.17388	1154.2	200.69
GLYFOS	Glyphosate	0.42	39,195.02	16,555.98
GRAMOXONE	Paraquat	1.1	2915.1	3,206.58
GUTHION	Azinphos-methyl	1.02	3443.6	3,512.42
HARMONY TOTAL	Clodinafop-propagy	0.0576	28875.1	1,663.21
	Thifensulfuron methyl	0.0025	28875.1	72.19
	Tribenuron methyl	0.0025	28875.1	72.19
HEADLINE	Pyraclostrobin	0.115	17906.5	2,059.25
HORIZON	Clodinafop-propargyl	0.06	261,225.92	15,046.61
HORIZON BTM	Clodinafop-propargyl	0.06	28,837.09	1,661.02
	Clodinafop-propargyl	0.26	28837.1	7,497.64
IMIDAN	Phosmet	1.35	297.0	401.00
K2	Flucarbazone	2.84	65,287.00	185,415.08
	Tribenuron methyl	0.01	65,287.00	326.44
	Thifensulfuron methyl	0.01	65,287.00	652.87
KOCIDE	Copper Hydroxide	1.35576	582.3	789.52
KUMULUS	Sulphur	0.001184	396.6	0.47
LAGON	Dimethoate	0.39	11440.5	4,461.78
LIBERTY	Glufosinate ammonium	0.42	300,053.72	124,972.38
LONTREL	Clopyralid	0.18	30853.6	5,553.65
LOROX L	Linuron	0.001	11916.0	11.92
LORSBAN	Chlorpyrifos	0.48	33,605.91	16,130.83
LYGON	MCPA	0.28	607.0	169.97
MALATHION	Malathion	0.86875	1271.5	1,104.63
MANZATE 200	Mancozeb	2.22	2948.9	6,546.66
	Manganese	0.444	2948.9	1,309.33
	Zinc	0.056	2948.9	165.14
	Ethylene bisdithiocarbamate	1.71976	2948.9	5,071.48
MATADOR	Cyhalothrin-Lambda	0.01	43,272.63	432.73
MAVRIK	Tau Fluvinate	0.0552	298.0	16.45
MCPA	MCPA	0.68	54,517.63	36,957.50
MCPA AMINE	MCPA	0.68	19807.3	13,468.99
MCPA ESTER	MCPA	0.59	22840.0	13,475.61
MCPA SODIUM SALT	MCPA	0.714	4203.9	3,001.57

Trade Name	Active Ingredients	Application Rate (kg a.i./ha)	Area Applied to (ha)	Quantity Applied (kg a.i.)
MEXTROL	Bromoxynil	0.28	8404.5	2,353.26
	MCPA	0.28	8404.5	2,353.26
MONITOR	Methamidophos	0.7344	569.0	417.86
MUSTER	Ethametsulfuron-methyl	0.02	39,249.65	735.93
MUSTER GOLD	Ethametsulfuron-methyl	0.02	45,735.99	857.55
ODYSSEY	Imazamox	0.02	177,772.13	3,199.90
	Imazethapyr	0.02	177,772.13	3,199.90
PARDNER	Bromoxynil	0.31	15090.7	4,678.13
PENNCOZEB	Manganese	0.444	1885.8	837.31
	Zinc	0.05624	1885.8	106.06
	Ethylene Bisdithiocarbamate	1.71976	1885.8	3,243.18
PINNACLE	Thifensulfuron methyl	0.005	12456.6	62.28
POAST	Sethoxydim	0.18	156,436.33	28,158.54
POLYRAM	Metiram	2.192	4379.9	9,600.77
PRESTIGE	Fluroxypyr	0.144	23849.3	3,434.30
	Clopyralid	0.1	23849.3	2,384.93
	MCPA	1	23849.3	23,849.34
PREVAIL	Tralkoxydim	0.2	1157.8	231.56
	Clopyralid	0.1	1157.8	115.78
	MCPA	0.56	1157.8	648.37
PRISM	Rimsulfuron	0.015	25768.0	386.52
PUMA	Fenozaprop-p-ethyl	0.07	520,252.53	37,978.43
PUMA/ATTAIN VIRTUAL PAK	2,4-D	0.56	1494.5	842.90
	Fluroxypyr	0.11	1494.5	161.41
	Fenozaprop-p-ethyl	0.07	1494.5	109.10
	Fenozaprop-p-ethyl	0.07	1681.5	122.75
	Bromoxynil	0.28	1681.5	470.81
	MCPA	0.28	1681.5	470.81
PURSUIT	Imazethapyr	0.05	31209.2	1,560.46
PURSUIT ULTRA	Imazethapyr	0.024	10218.9	245.25
PYRINEX	Chlorpyrifos	0.7	6763.5	4,734.46
QUADRIS	Azoxystrobin	0.17	7735.2	1,314.98
REFINE	Thifensulfuron methyl	0.01	131,301.92	656.51
REFINE EXTRA	Tribenuron methyl	0.01	148,010.82	740.05
	Thifensulfuron methyl	0.01	148,010.82	1,480.11
REGLONE	Diquat	0.5	12747.2	6,373.60
RENEGADE	Glyphosate	1	4205.9	4,205.90
RIDOMIL	Metalaxyl-m	0.41	5069.9	2,078.66
RIDOMIL MZ	Metalaxyl	0.1	1372.7	137.27
	Mancozeb	1.6	1372.7	2,196.31
RIPCORD	Cypermethrin	0.04	4653.5	186.14
RONILAN	Vinclozin	0.49	128,089.56	62,763.89
ROUNDUP	Glyphosate	0.65	536,532.63	346,675.19
ROVRAL	Iprodione	0.82	138,056.89	112,603.34
RUSTLER	2,4-D	0.20475	371.1	75.98

Trade Name	Active Ingredients	Application Rate (kg a.i./ha)	Area Applied to (ha)	Quantity Applied (kg a.i.)
	Glyphosate	0.1215	333.9	40.56
SELECT	Clethodim	0.05	246,604.26	12,132.93
SELECT/BUCTRIL VIRT'L PAK	Clethodim	0.0744	607.0	45.16
	Bromoxynil	0.28	607.0	169.97
SENCOR	Metribuzin	0.28	30,472.14	8,571.81
	Metribuzin	0.24	30472.1	7,313.31
SEVIN	Carbaryl	1.42	34,715.15	49,295.51
SPECTRUM	Florasulam	0.01	26,505.29	132.53
	Clopyralid	0.08	26,505.29	1,987.90
	MCPA	0.42	26,505.29	11,132.22
STAMPEDE	Propanil	1	4095.0	4,095.01
STAMPEDE CM	Propanil	1	117.4	117.36
SUCCESS	Spinosad	0.0624	846.2	52.80
SUNDANCE	Sulfosulfuron	0.02	16,817.32	340.55
	Sulfosulfuron	0.02	16817.3	336.35
SWORD	MCPA	0.34375	495.3	170.27
	Mecoprop	0.078125	495.3	38.70
	Dicamba	0.078125	495.3	38.70
TARGET	MCPA	0.34	98,389.24	33,821.30
	Mecoprop	0.08	98,389.24	7,687.15
	Dicamba	0.08	98,389.24	7,687.15
TELAR	Chlorsulfuron	0.09	3729.6	335.66
THIMET	Phorate	3.264	734.9	2,398.74
THIODAN	Endosulfan	0.888	2071.6	1,839.57
THUMPER	Bromoxynil	0.48	35,941.75	17,252.04
	2,4-D	1.19	35,941.75	42,770.68
TILT	Propiconazole	0.13	369,319.15	46,164.89
TOUCHDOWN	Glyphosate	1.50	51,022.97	76,534.45
TREFLAN (QR5, EC)	Trifluralin	1.27	46,855.52	59,506.50
TRIUMPH PLUS	Fenoxaprop-p-ethyl	0.09184	2685.9	246.67
	MCPA	0.4198	2685.9	1,127.54
	Thifensulfuron methyl	0.015	2685.9	40.29
TROPHY	Fluroxypyr	0.108	3140.8	339.20
	MCPA	0.56	3140.8	1,758.83
TROPOTOX	MCPB	1.42875	220.6	315.12
	MCPA	0.09525	185.3	17.65
TURBOPROP	2.4-D	0.49	5095.4	2,496.74
	Dichlorprop	0.53	5095.4	2,700.56
ULTIM	Rimsulfuron	0.01	26,270.17	332.05
	Nicosulfuron	0.01	26,270.17	332.05
	Rimsulfuron	0.0013	26270.2	34.15
	Nicosulfuron	0.0013	26270.2	34.15
VANTAGE	Glyphosate	0.50	60,685.44	30,245.63
VELPAR L	Hexazinone	2.055	1579.1	3,245.02
VENTURE	Fluazifop-P-butyl	0.1875	1819.5	341.15

Appendix 7: Ontario

Source: McGee, B., H. Berges and K. Callow, 2004

Table 40: Pesticides used on Ontario crops in 2003. Top 10 are in **bold**.

Active Ingredient	Pesticide Type	Quantity used (kg)	Proportion (%)
Glyphosate	**Herbicide**	**1,170,762**	**27.75**
Atrazine	**Herbicide**	**513,950**	**12.18**
s-metolachlor	**Herbicide**	**286,923**	**6.80**
Metolachlor	**Herbicide**	**255,705**	**6.06**
1,3-dichloropropene	**Insecticide**	**239,824**	**5.69**
Dimethanamid	**Herbicide**	**205,291**	**4.87**
Dicamba	**Herbicide**	**195,627**	**4.64**
Fatty alcohol- N-decanol	**Growth Regulator**	**133,856**	**3.17**
MCPA/MCPB	**Herbicide**	**129,337**	**3.07**
2,4 D amine	**Herbicide**	**87,261**	**2.07**
Pendimethalin	Herbicide	85,334	2.02
Chloropicrin	Soil fumigant	81,847	1.94
Bromoxynil	Herbicide	80,871	1.92
Mancozeb	Fungicide	64,647	1.53
Captan	Fungicide	61,422	1.46
Bentazon	Herbicide	59,300	1.41
Sulphur	Fungicide	54,106	1.28
Chlorothalonil	Fungicide	38,570	0.91
Metribuzin	Herbicide	36,966	0.88
Metiram	Fungicide	34,111	0.81
2,4-DB	Herbicide	28,256	0.67
Related triazines	Herbicide	25,241	0.60
Flumetsulam	Herbicide	22,807	0.54
Nicosulfuron	Herbicide	18,360	0.44
Linuron	Herbicide	17,634	0.42
Imazethapyr	Herbicide	17,338	0.41
Trifluralin	Herbicide	16,889	0.40
Glufosinate ammonium	Herbicide	13,602	0.32
Phosmet	Insecticide	12,362	0.29
Ammonium sulfamate	Herbicide	11,230	0.27
Metalaxyl	Fungicide	10,891	0.26
Azinphos-methyl	Insecticide	9,905	0.23
Dichlorprop	Herbicide	9,459	0.22
Acephate	Insecticide	9,402	0.22
Copper hydroxide	Fungicide	8,371	0.20
Flufenacet	Herbicide	8,032	0.19
Dichloropropene	Soil fumigant	7,592	0.18
Diflufenzopyr	Herbicide	6,996	0.17
Dimethoate	Insecticide	6,558	0.16
Copper oxychloride	Fungicide	6,318	0.15
Rimsulfuron	Herbicide	6,212	0.15
B.t	Insecticide	6,140	0.15
Tebuconazole	Fungicide	5,788	0.14
Fosetyl-al	Fungicide	5,373	0.13
Chlorpyrifos	Insecticide	5,366	0.13

Active Ingredient	Pesticide Type	Quantity used (kg)	Proportion (%)
Fatty alcochol-emtrol	Growth Regulator	5,136	0.12
Metallic copper	Fungicide	5,058	0.12
Carbaryl	Insecticide	4,851	0.12
Amitrole	Herbicide	4,169	0.10
Diazinon	Insecticide	3,970	0.09
Endosulfan	Insecticide	3,689	0.09
Clopyralid	Herbicide	3,641	0.09
Folpet	Insecticide	3,280	0.08
Fomesafen	Fungicide	3,077	0.07
Iprodione	Fungicide	2,956	0.07
Ethephon	Fungicide	2,868	0.07
Napropamide	Herbicide	2,786	0.07
Propiconazole	Fungicide	2,648	0.06
Dinocap	Fungicide	2,627	0.06
Tefluthrin	Insecticide	2,583	0.06
Prosulfuron	Herbicide	2,567	0.06
Isoxaflutole	Herbicide	2,565	0.06
Methyl isothiocyanate	Insecticide	2,317	0.05
Diquat	Herbicide	2,107	0.05
EPTC	Herbicide	1,945	0.05
Ferric dimethyldithiocarbamate	Fungicide	1,944	0.05
Promethryne	Herbicide	1,916	0.05
Ferbam	Herbicide	1,898	0.04
Cypermethrin	Insecticide	1,810	0.04
Phosalone	Insecticide	1,801	0.04
Carbofuran	Insecticide	1,778	0.04
Terbufos	Insecticide	1,729	0.04
Malathion	Insecticide	1,543	0.04
Paraquat	Herbicide	1,271	0.03
Fenoxaprop-ethyl	Herbicide	1,215	0.03
Flusilazolee	Fungicide	1,187	0.03
Clomazone	Herbicide	1,029	0.02
Methamidophos	Insecticide	981	0.02
Copper sulphate	Fungicide	922	0.02
Vinclozen	Herbicide	899	0.02
Other herbicide	Herbicide	778	0.02
Pyrazon	Herbicide	764	0.02
Myclobutanil	Fungicide	740	0.02
Mecoprop	Herbicide	703	0.02
Other insecticide	Insecticide	655	0.02
Kresoxim-methyl	Fungicide	652	0.02
Permethrin	Insecticide	647	0.02
Pirimicarb	Insecticide	642	0.02
Thifensulfuron-methyl	Herbicide	613	0.01
Terbacil	Herbicide	609	0.01
Pyridaben	Insecticide	593	0.01
Dodine	Fungicide	577	0.01
Methomyl	Insecticide	558	0.01

Active Ingredient	Pesticide Type	Quantity used (kg)	Proportion (%)
Imidacloprid	Insecticide	527	0.01
Tallow fatty acid	Growth Regulator	499	0.01
Chlorthal dimethyl	Herbicide	453	0.01
Cyanazine	Herbicide	443	0.01
Metam-sodium	Soil fumigant	441	0.01
Antimycin	Insecticide	440	0.01
Other fungicide	Fungicide	405	0.01
Dichlobenil	Herbicide	402	0.01
Quizalofop-ethyl	Herbicide	371	0.01
Sethoxydim	Herbicide	335	0.01
Bensulfide	Herbicide	330	0.01
Tralkoxydim	Herbicide	323	0.01
Naled	Insecticide	315	0.01
Diuron	Herbicide	299	0.01
Fenhexamid	Fungicide	290	0.01
Primisulfuron-methyl	Herbicide	285	0.01
Cyhalothrin-lamda	Insecticide	271	0.01
Aciflurofen	Herbicide	262	0.01
Trichlorfon	Rodenticide	221	0.01
Fenbuconazole	Fungicide	217	0.01
Parathion	Insecticide	211	0.01
Pyraclostrobin	Fungicide	204	0.00
Other growth regulator	Growth Regulator	53	0.00
TOTAL		**4,218,238**	**100.00**

As of 2001, the use of parathion was discontinued in Canada.

Appendix 8: Quebec

Source: Gorse, I., 2005

Table 41: Sales of pesticide active ingredients by chemical group

Chemical Group	2001 Sales (kg a.i.)	Proportion of sales in 2001 (%)
Organophosphates	377,830	11.5
Triazines and tetrazines	352,477	10.8
Aryloxyacids and derivatives	297,592	9.1
Mineral and vegetable oils	275,366	8.4
Biscarbamates	249,845	7.6
Amides	244,452	7.6
Hydrocarbons	169,293	5.2
Fatty acids and surfactants	123,452	3.8
Nitrobenzenes	112,148	3.4
Thiophosphates	110,316	3.4
Diazines	104,707	3.2
Dithiocarbamates	103,676	3.2
Benzonitriles	100,701	3.1
Inorganics	95,757	2.9
Organochlorines	82,771	2.5
Carbamates	78,110	2.4
Benzoic acid and derivatives	74,493	2.3
Phtalic acid and derivatives	71,857	2.2
Ureas	40,927	1.2
Azoles, oxazoles and thiazoles	35,906	1.1
Thiocarbamates	29,454	0.9
Others	24,367	0.7
Pyrethrinoids	23,036	0.7
Quaternary ammoniums	18,730	0.6
Phosphoramidoates	13,492	0.4
Oxathiines	9,612	0.3
Alcohols	9,528	0.3
Triazoles	8,709	0.3
Halogenated hydrocarbons	7,960	0.2
Halogenated organic acids	7,223	0.2
Sulfonylureas	5,194	0.2
Other organic acids	4,920	0.1
Oxime-carbamates	3,848	0.1
Phosphates	3,840	0.1
Guanidines	2,359	0.1
Bacillus thuringiensis	841	0.0
Cyclohexanedione-oximes	808	0.0
Anilines	308	0.0
Pyridines	173	0.0
Organometals	108	0.0

Chemical Group	2001 Sales (kg a.i.)	Proportion of sales in 2001 (%)
Chromenones	82	0.0
Indanediones	6	0.0
Quinoxalines	1	0.0
TOTAL	**3,276,257**	**100.0**

Top 10 chemical groups and active ingredients for Quebec in 2001.
For full listing of active ingredients in chemical groups see Gorse, I., 2005.

GROUPES CHIMIQUES	NOM DES INGRÉDIENTS	ACTIFS TYPE D'UTILISATION
ORGANOPHOSPHORÉS		
	Fonofos	Insecticide
	Éthéphon	Régulateur de croissance
	Glufosinate d'ammonium	Herbicide
	Glyphosate, présent sous forme de sel d'isopropylamine	Herbicide
	Glyphosate, sel de mono-ammonium	Herbicide
	Acide de glyphosate	Herbicide
	Glyphosate, sel de triméthylsulfonium	Herbicide
	Fosamine d'ammonium	Herbicide
	Trichlorfon	Insecticide
TRIAZINES ET TRÉTRAZINES		
	Atrazine et triazines actives apparentées	Herbicide
	Métribuzine	Herbicide
	Cyromazine	Insecticide
	Cyanazine	Herbicide
	Clofentézine	Insecticide
	Anilazine	Fongicide
	Hexahydro tris(hydroxy-2 éthyl)-1,3,5-triazine	Biocide
	Prométryne et triazines actives apparentées	Herbicide
	Simazine et triazines actives apparentées	Herbicide
ARYLOXYACIDES ET DÉRIVÉS		
	Dichlorprop, présent sous forme d'ester de butoxyéthyle ou d'esters d'isooctyle	Herbicide
	2,4-DB présent sous forme d'esters de butyl mélangés ou d'esters d'isooctyle	Herbicide

	Diclofop-méthyl	Herbicide
	2,4-D, présent sous forme d'acide	Herbicide
	2,4-D, présent sous forme des sels d'amine (diméthylamine, diéthanolamine ou d'autres sels d'amine)	Herbicide
	2,4-D présent sous forme d'esters peu volatils	Herbicide
	Clodinafop-propargyl	Herbicide
	Fénoprop, présent sous forme d'acide, des sels (triéthanolamine, sodium), ou d'esters (butoxyéthyle, isooctyle, butoxypropyle)	Herbicide
	Fénoxaprop	Herbicide
	Fénoxaprop-p-éthyl	Herbicide
	Fluazifop-p-butyl	Herbicide
	Fluazifop-butyl	Herbicide
	MCPA , présent sous forme de sels (diéthanolamine, diméthylamine, ou d'amines mélangées)	Herbicide
	MCPA , présent sous forme d'esters	Herbicide
	MCPA , présent sous forme de sel de potassium ou de sel de sodium	Herbicide
	MCPB , présent sous forme de sel de sodium	Herbicide
	Mécoprop (stéréoisomère-d), présent sous forme de sel de potassium	Herbicide
	Mécoprop (stéréoisomère-d), présent sous forme de sels d'amine	Herbicide
	Mécoprop (stéréoisomère-d), présent sous forme d'acide	Herbicide
	Quizalofop-éthyl	Herbicide
	Quizalofop p-éthyl	Herbicide
HUILES MINÉRALES ET VÉGÉTALES	Huile minérale à base de paraffine (adjuvant)	Adjuvant

	Huile minérale (herbicide ou régulateur de croissance des plantes)	Herbicide
	Huile minérale (insecticide)	Insecticide
	Huile végétale	Adjuvant
BISCARBAMATES		
	Desmédiphame	Herbicide
	Ferbame	Fongicide
	Manèbe	Fongicide
	Mancozèbe	Fongicide
	Métirame	Fongicide
	Nabame	Biocide
	Phenmédiphame	Herbicide
	Thirame	Fongicide
	Thiophanate-méthyl	Fongicide
	Zinèbe	Fongicide
	Zirame	Fongicide
AMIDES		
	Dibromo-2,2 nitrilo-3 propionamide	Biocide
	Capsaïcine	Rodenticide
	Diméthomorphe	Fongicide
	DEET et dérivés actifs	Insecticide
	Fénexamide	Fongicide
	Pipérine	Rodenticide
	Fomésafène	Herbicide
	Propyzamide	Herbicide
	Diméthénamide	Herbicide
	Méfénoxam	Fongicide
	Métalaxyl	Fongicide
	Méthalaxyl-M	Fongicide
	Métolachlore	Herbicide
	S-Métholachlore	Herbicide

	Acétamide de naphtalène	Régulateur de croissance
	Napropamide	Herbicide
	Homopolymère de propèn-2 amide	Adjuvant
	Propanil	Herbicide
	Tébufénozide	Insecticide
	Zoxamide	Fongicide
HYDROCARBURES		
	Matières asphaltiques solides	Herbicide
	Créosote	Fongicide
	Naphtalène	Insecticide
	Butènes polymérisés	Rodenticide
ACIDES GRAS ET SURFACTANTS		
	Acide dodécyl benzènesulfonique	Autres
	(z)-8-Dodecen-1-ol (phéromone)	Insecticide
	(z)-8-Dodecenyl acétate (phéromone)	Insecticide
	(e)-8-Dodecenyl acétate (phéromone)	Insecticide
	Mélange d'acides caprique et pélargonique	Herbicide
	Nonylphénoxypolyéthoxyéthanol	Adjuvant
	Octylphénoxypolyéthoxyéthanol	Adjuvant
	Phosphate d'octylphénoxypolyéthoxyéthanol	Adjuvant
	Phosphate d'alkyle polyoxyalkyl	Adjuvant
	Poly-[dichlorure d'oxyéthylène (diméthyliminio) éthylène (diméthyliminio) éthylène]	Biocide
	Lauryl sulfate de sodium	Autres
	Savon insecticide	Insecticide
	Savon (herbicide)	Herbicide
	Amine éthoxylate d'acide gras de suif	Adjuvant
	Mélange de surfactants	Adjuvant
NITROBENZÈNES		
	Dichloran	Fongicide

	Dinocap et dérivés actifs	Insecticide
	DNOC, présent sous forme de sel de sodium	Herbicide
	Éthalfluraline	Herbicide
	Oxyfluorfène	Herbicide
	Pendiméthaline	Herbicide
	Quintozène	Fongicide
	Trifluraline	Herbicide
THIOPHOSPHATES	Azamethiphos	Insecticide
	Bensulide	Herbicide
	Coumaphos	Insecticide
	Terbufos	Insecticide
	Diazinon	Insecticide
	Diméthoate	Insecticide
	Disulfoton	Insecticide
	Chlorpyrifos	Insecticide
	Fenthion	Insecticide
	Azinphos-méthyl	Insecticide
	Malathion	Insecticide
	Méthidathion	Insecticide
	Oxydéméton-méthyl	Insecticide
	Phorate	Insecticide
	Phosalone	Insecticide
	Phosmet	Insecticide
	Parathion	Insecticide
	Pyrazophos	Insecticide
	Sulfotep et dérivés actifs	Insecticide

Appendix 9: New Brunswick

Source: New Brunswick Department of the Environment and Local Government, 2005

Table 42: Pesticides sold in New Brunswick in 2003. Top 10 are in **bold.**

Active Ingredient	Type of Pesticide	Quantity Sold (kg a.i.)	Proportion (%)
Mancozeb	**Fungicide**	**383,277.97**	**49.02**
Glyphosate	**Herbicide**	**122,609.33**	**15.68**
Chlorothalonil	**Fungicide**	**64,367.11**	**8.23**
Linuron	**Herbicide**	**35,722.50**	**4.57**
MCPA	**Herbicide**	**17,053.95**	**2.18**
Metribuzin	**Herbicide**	**15,919.38**	**2.04**
Metiram	**Fungicide**	**14,616.00**	**1.87**
Triclopyr	**Herbicide**	**9,744.89**	**1.25**
Mineral oil (insecticidal)	**Insecticide**	**9,271.80**	**1.19**
Imidacloprid	**Insecticide**	**7,821.80**	**1.00**
Endosulfan	Insecticide	6,137.40	0.78
Methomyl	Insecticide	5,791.08	0.74
Maleic hydrazide present as diethanolamine salt	Growth Regulator	5,680.26	0.73
Triforine	Herbicide	4,827.28	0.62
Metalaxyl	Fungicide	3,730.32	0.48
Hexazinone	Herbicide	3,571.16	0.46
Atrazine + related active triazines	Herbicide	3,530.69	0.45
Diazinon	Insecticide	3,292.33	0.42
Azinphos-methyl	Insecticide	3,174.68	0.41
2,4-D	Herbicide	3,083.51	0.39
Thiabendazole	Fungicide	3,053.25	0.39
Methamidophos	Insecticide	2,900.16	0.37
Propamocarb hydrochloride	Fungicide	2,787.38	0.36
Chlorpyrifos	Insecticide	2,749.32	0.35
Paraquat	Herbicide	2,631.20	0.34
Captan	Fungicide	2,517.16	0.32
Simazine plus related active triazines	Herbicide	2,483.68	0.32
Terbacil	Herbicide	2,328.00	0.30
Glusofinate ammonium	Herbicide	2,243.55	0.29
Propiconazole	Fungicide	2,186.00	0.28
Permethrin	Insecticide	2,047.65	0.26
Carbaryl	Insecticide	1,906.56	0.24
Nonylphenoxypolyethoxyethanol	Surfactant	1,830.00	0.23
Cypermethrin	Insecticide	1,702.00	0.22
2,4-DB present as mixed butyl esters	Herbicide	1,637.80	0.21
Dicamba	Herbicide	1,562.22	0.20
Cupric hydroxide	Fungicide	1,557.07	0.20

Active Ingredient	Type of Pesticide	Quantity Sold (kg a.i.)	Proportion (%)
Dimethoate	Insecticide	1,476.48	0.19
Mecoprop	Herbicide	1,237.66	0.16
Diquat	Herbicide	1,177.80	0.15
Trichlorfon	Insecticide	1,002.96	0.13
Trifluralin	Herbicide	910.14	0.12
Phorate	Insecticide	878.40	0.11
Azoxystrobin	Fungicide	855.08	0.11
Surfactant blend	Surfactant	852.93	0.11
Carbathion	Fungicide	839.16	0.11
Carbofuran	Insecticide	789.44	0.10
Thiram	Fungicide	777.31	0.10
Iprodione	Fungicide	667.80	0.09
Metobromuron	Herbicide	630.40	0.08
Octylphenoxypolyethoxyethanol	Surfactant	594.00	0.08
Malathion	Insecticide	565.60	0.07
EPTC	Herbicide	528.00	0.07
Folpet	Fungicide	468.50	0.06
Fludioxonil	Fungicide	455.01	0.06
Terbufos	Insecticide	448.65	0.06
Rimsulfuron	Herbicide	388.76	0.05
Dichlobenil	Herbicide	344.64	0.04
Fluazifop-p-butyl	Herbicide	321.89	0.04
Metolachlor	Herbicide	289.80	0.04
Parathion	Insecticide	288.00	0.04
Bromacil	Herbicide	241.92	0.03
Tribenuron methyl	Herbicide	223.71	0.03
Clethodim	Herbicide	221.64	0.03
Phosalone	Insecticide	207.50	0.03
Chlormequat	Growth Regulator	202.40	0.03
Cyanazine	Herbicide	192.00	0.02
Tallow fatty acid	Surfactant	192.00	0.02
Ferbam	Fungicide	187.10	0.02
Acephate	Insecticide	181.95	0.02
Myclobutanil	Fungicide	175.18	0.02
B.t.berliner ssp. *kurstaki*	Insecticide	160.00	0.02
Bentazon	Herbicide	156.48	0.02
Benomyl	Fungicide	144.00	0.02
Oxyfluorfen	Herbicide	137.66	0.02
Napropamide	Herbicide	125.57	0.02
Vinclozolin	Fungicide	116.00	0.01
Dodine	Fungicide	94.90	0.01

Active Ingredient	Type of Pesticide	Quantity Sold (kg a.i.)	Proportion (%)
n-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium cholride	Anti-microbial	81.40	0.01
Monolinuron	Herbicide	80.00	0.01
Arsenic	Herbicide	59.28	0.01
Methyl-3-(4-methyl-6methyl-1,,3,5-trizin-z)methom	Herbicide	58.46	0.01
Bromoxynil	Herbicide	57.40	0.01
Dimethomorph	Fungicide	56.70	0.01
Copper oxichlorid	Anti-microbial	50.00	0.01
Phosmet	Insecticide	41.50	0.01
Pyrazon	Herbicide	28.81	0.00
Zinc phosphide	Rodenticide	25.20	0.00
Diphenylamine	Growth Regulator	24.32	0.00
Paraffin based mineral oil	Herbicide	24.07	0.00
Lime sulphur (calcium polysulphide)	Fungicide	19.80	0.00
Quintozene	Fungicide	18.75	0.00
Disulfoton	Insecticide	18.00	0.00
Cyhalothrin-lambda	Insecticide	17.34	0.00
Pirimicarb	Insecticide	17.00	0.00
Dichlorprop (butoxyethyl ester)	Herbicide	14.10	0.00
Propyzamide	Herbicide	13.60	0.00
Deltramethrin	Insecticide	11.78	0.00
MCPB present as sodium salt	Herbicide	10.42	0.00
Clopyralid	Herbicide	9.13	0.00
Sulphur	Fungicide	8.90	0.00
Azamethiphos	Herbicide	8.35	0.00
Dicofol	Insecticide	7.40	0.00
Chlorpropham	Growth Regulator	6.72	0.00
Thiophanate-methyl	Fungicide	6.30	0.00
Quizalofop-ethyl	Herbicide	5.76	0.00
Diclofop-methyl	Herbicide	5.68	0.00
Oxycarboxin	Fungicide	5.25	0.00
Ethephon	Growth Regulator	4.80	0.00
Piperonyl butoxide	Insecticide	3.91	0.00
B.t. serotype H-14	Insecticide	3.54	0.00
Sethoxydim	Herbicide	3.13	0.00
Formaldehyde	Anti-microbial	2.95	0.00
Oxamyl	Insecticide	2.64	0.00

Active Ingredient	Type of Pesticide	Quantity Sold (kg a.i.)	Proportion (%)
Fenthion	Insecticide	2.47	0.00
Naptalam present as acid, or as sodium salt	Herbicide	2.40	0.00
Prometryne plus related active triazines	Herbicide	2.20	0.00
Fenvalerate	Insecticide	1.85	0.00
n-octyl bicyclotheptene dicarboximide	Insecticide	1.42	0.00
Muscalure	Insecticide	0.96	0.00
Oxadiazon	Herbicide	0.91	0.00
Pyrethrins	Insecticide	0.91	0.00
Naphthalene Acetic Acid	Growth Regulator	0.52	0.00
Chlofentizine	Insecticide	0.47	0.00
Lindane (Gamma-bhc)	Insecticide	0.35	0.00
Rotenone	Herbicide	0.28	0.00
Imazethapyr	Herbicide	0.24	0.00
Oxydemeton-methyl	Insecticide	0.24	0.00
di-n-propyl isocinchomeronate	Insecticide	0.16	0.00
Coumaphos	Insecticide	0.06	0.00
Brodifacoum	Rodenticide	0.01	0.00
Bromadiolone	Rodenticide	0.00	0.00
Diphacinone	Rodenticide	0.00	0.00
TOTAL		**781,922.67**	**100.00**

As of 2001, the use of lindane and parathion was discontinued in Canada.

Appendix 10: Nova Scotia

Table 43: Pesticides sold/used in Nova Scotia in 2003 Top 10 are in **bold.**

Pesticide	Pesticide Type	Quantity (kg)	Proportion (%)
Mecoprop	**Herbicide**	**206,604.75**	**46.78**
Mineral and vegetable oils	**Insecticidal/Herbicidal/ Adjuvant**	**41,212.68**	**9.33**
Hexazinone	**Herbicide**	**21,492.73**	**4.87**
Glyphosate	**Herbicide**	**17,218.70**	**3.90**
Metiram	**Fungicide**	**14,706.40**	**3.33**
Captan	**Fungicide**	**14,514.49**	**3.29**
B.t.* Berliner ssp. *kurstaki	**Insecticide**	**11,532.00**	**2.61**
Chlorothalonil	**Fungicide**	**10,502.90**	**2.38**
Pendimethalin	**Herbicide**	**9,858.40**	**2.23**
Mancozeb	**Fungicide**	**6,501.24**	**1.47**
Atrazine + related active triazines	Herbicide	6,247.75	1.41
MCPA/MCPB	Herbicide	6,109.27	1.38
Carbaryl	Insecticide	5,773.16	1.31
Nicosulfuron	Herbicide	5,004.30	1.13
2,4-D	Herbicide	4,633.37	1.05
Linuron	Herbicide	4,540.10	1.03
Prometryne plus related active triazines	Herbicide	3,827.02	0.87
1,3-dichloropropene	Insecticide	3,795.98	0.86
Diazinon	Insecticide	3,786.27	0.86
Phorate	Insecticide	2,887.80	0.65
s-metolachlor	Herbicide	2,849.76	0.65
Sulphur	Fungicide	2,848.68	0.65
Phosmet	Insecticide	2,454.00	0.56
Quintozene	Fungicide	2,414.25	0.55
Copper Sulphate	Fungicide	1,936.19	0.44
Chlorpyrifos	Insecticide	1,715.06	0.39
Metolachlor	Herbicide	1,514.55	0.34
EPTC	Herbicide	1,248.00	0.28
Nonylphenoxypolyethoxyethanol	Adjuvant	1,239.68	0.28
Triclopyr	Insecticide	1,158.72	0.26
Iprodione	Fungicide	1,084.33	0.25
Dicamba	Herbicide	1,042.53	0.24
Dimethoate	Insecticide	856.32	0.19
Metalaxyl	Fungicide	813.59	0.18
Chloropicrin	Fumigant	799.92	0.18
Napropamide	Herbicide	722.09	0.16
2,4-DB	Herbicide	704.75	0.16
Permethrin	Insecticide	683.22	0.15

Pesticide	**Pesticide Type**	**Quantity (kg)**	**Proportion (%)**
Monochlorobenzene	Herbicide	661.20	0.15
Surfactant Blend	Adjuvant	653.75	0.15
Bentazon	Herbicide	607.12	0.14
Propiconazole	Fungicide	548.13	0.12
Fosetyl-Al	Fungicide	541.15	0.12
Metribuzin	Herbicide	505.00	0.11
Triazole	Fungicide	502.50	0.11
Phosalone	Insecticide	497.50	0.11
Cypermethrin	Insecticide	495.45	0.11
Simazine plus related active triazines	Herbicide	490.27	0.11
Trifluralin	Herbicide	478.67	0.11
Paraffin Base Mineral Oil (Adjuvant)	Adjuvant	473.10	0.11
Fluazifop-p-butyl	Fungicide	425.00	0.10
Endosulfan	Insecticide	387.00	0.09
Chlorthal dimethyl	Herbicide	367.50	0.08
Bacillus thuringiensis , Serotype H-14	Insecticide	352.00	0.08
Malathion	Insecticide	319.03	0.07
Benomyl	Fungicide	291.50	0.07
Cyanazine	Herbicide	291.40	0.07
Thiophanate-Methyl	Fungicide	268.40	0.06
Azinphos-Methyl	Insecticide	252.63	0.06
Terbacil	Herbicide	251.20	0.06
Imidacloprid	Insecticide	248.42	0.06
Terbufos	Insecticide	234.00	0.05
Paraquat	Herbicide	228.20	0.05
Bromoxynil	Herbicide	210.60	0.05
Myclobutanil	Fungicide	164.42	0.04
Rimsulfuron	Herbicide	145.34	0.03
Pirimicarb	Insecticide	143.38	0.03
Diphenylamine	Fungicide	119.20	0.03
Lindane (Gamma-BHC)	Insecticide	114.07	0.03
Soap	Herbicide	110.50	0.03
Folpet	Insecticide	110.00	0.02
2-(Hydroxymethyl)-2-Nitro-1,3-Propanediol	Anti-microbial	108.60	0.02
Metalaxyl-m	Fungicide	108.53	0.02
Pyridaben	Insecticide	104.79	0.02

Pesticide	Pesticide Type	Quantity (kg)	Proportion (%)
Zineb	Fungicide	104.00	0.02
Propamocarb Hydrochloride	Fungicide	100.25	0.02
Thiram	Fungicide	99.55	0.02
Diquat	Herbicide	93.80	0.02
Tebuthiuron	Herbicide	93.60	0.02
Carbofuran	Insecticide	90.80	0.02
Daminozide	Growth Regulator	85.85	0.02
Pyrazon	Herbicide	83.61	0.02
Acephate	Insecticide	82.13	0.02
Formaldehyde	Fungicide	77.93	0.02
Methomyl	Insecticide	77.74	0.02
Carbathiin	Fungicide	72.24	0.02
Dichlorprop	Herbicide	72.00	0.02
Chlorthal	Herbicide	70.50	0.02
Potassium monpersulfate	Fungicide	67.41	0.02
Dichlobenil	Herbicide	66.24	0.01
Zinc		63.36	0.01
Kresoxim-methyl	Fungicide	61.88	0.01
Clopyralid	Herbicide	57.10	0.01
Ethephon	Fungicide	57.00	0.01
Propyzamide	Herbicide	54.32	0.01
Dinocap	Fungicide	47.61	0.01
Chlormequat	Growth Regulator	47.14	0.01
Formetanate Hydrochloride	Insecticide	45.54	0.01
Copper hydroxide	Fungicide	42.72	0.01
Trichlorfon	Rodenticide	42.00	0.01
Lime sulphur (calcium polysulphide)	Fungicide	41.80	0.01
Dichlorvos	Insecticide	40.65	0.01
Ammonium sulphate	Adjuvant	39.20	0.01
Chlorpropham	Herbicide	39.20	0.01
Naled	Insecticide	39.19	0.01
Copper Oxychloride	Fungicide	39.00	0.01
Tefluthrin	Insecticide	39.00	0.01
Maleic Hydrazide	Growth Regulator	36.16	0.01
N-Alkyl (40% C12, 50% C14, 10% C16) Dimethyl Benzyl Ammonium Chloride	Anti-microbial	35.50	0.01
Diclofop-Methyl	Herbicide	34.95	0.01

Pesticide	Pesticide Type	Quantity (kg)	Proportion (%)
Dodemorph-Acetate	Fungicide	34.44	0.01
Asphalt	Fungicide	34.30	0.01
Glufosinate Ammonium	Herbicide	32.20	0.01
Didecyl Dimethyl Ammonium Chloride	Anti-microbial	29.47	0.01
Tetrachlorvinphos	Insecticide	29.00	0.01
N-Alkyl (67% C12, 25% C14, 7% C16, 1% C18) Dimethyl Benzyl Ammonium Chloride	Anti-microbial	27.72	0.01
Ferbam	Herbicide	27.60	0.01
Clethodim	Herbicide	26.91	0.01
Zinc Phosphide	Rodenticide	26.80	0.01
Sethoxydim	Herbicide	26.16	0.01
Tribenuron Methyl	Herbicide	26.05	0.01
Tebufenozide	Insecticide	25.92	0.01
Oxyfluorfen	Herbicide	24.80	0.01
Metaldehyde	Molluscicide	22.20	0.01
Vinclozolin	Herbicide	21.50	0.00
Propoxur	Insecticide	18.72	0.00
Polyphenylene isooctylphenyl	Adjuvant	18.20	0.00
Siloxylated polyether	Adjuvant	16.98	0.00
Triforine	Fungicide	16.38	0.00
Fenhexamid	Fungicide	15.50	0.00
Deltamethrin	Insecticide	15.35	0.00
Azoxystrobin	Fungicide	15.25	0.00
Methamidophos	Insecticide	14.40	0.00
Fludioxonil	Herbicide	11.60	0.00
Dicofol	Insecticide	11.34	0.00
Octylphenoxypolyethoxyethanol	Adjuvant	10.40	0.00
Aminoethoxyvinylclycine	Growth Regulator	9.94	0.00
Diuron	Herbicide	9.60	0.00
Parathion	Insecticide	9.60	0.00
Thifensulfuron Methyl	Herbicide	9.32	0.00
Dodine	Fungicide	7.80	0.00
Thiabendazole	Fungicide	7.20	0.00
Alkylphenol ethoxylate	Adjuvant	7.20	0.00
Flusilazole	Fungicide	6.00	0.00

Pesticide	Pesticide Type	Quantity (kg)	Proportion (%)
Clofentezine	Insecticide	5.68	0.00
O-Phenylphenol	Anti-microbial	5.59	0.00
Etridiazole	Herbicide	5.09	0.00
O-Benzyl-P-Chlorophenol	Anti-microbial	4.99	0.00
Naptalam	Herbicide	4.80	0.00
Methidathion	Insecticide	4.80	0.00
Pyraclostrobin	Fungicide	3.63	0.00
Piperonyl butoxide	Insecticide	3.62	0.00
Chlofentizine	Insecticide	3.54	0.00
Cyhalothrin-Lambda	Insecticide	3.15	0.00
Oxycarboxin	Fungicide	3.00	0.00
Acetic Acid	Herbicide	2.50	0.00
Oxine Benzoate	Fungicide	2.30	0.00
4-(cyclopropyl-alpha-hydroxy-methylene)-3,5-dioxo-cyclohexane	Growth Regulator	2.14	0.00
Pymetrozine	Insecticide	2.10	0.00
Paclobutrazol	Growth Regulator	1.68	0.00
Methoprene	Insecticide	1.68	0.00
Acetemiprid	Insecticide	1.67	0.00
Oxadiazon	Herbicide	1.60	0.00
Abamectin	Insecticide	1.44	0.00
Naphthaleneacetamide	Growth Regulator	1.32	0.00
Naphthalene Acetic Acid	Growth Regulator	1.14	0.00
Pyrethrins	Insecticide	1.14	0.00
Cymoxanill	Fungicide	1.08	0.00
P-Tert Amyl Phenol	Anti-microbial	1.03	0.00
Maneb	Fungicide	1.00	0.00
Ethametsulfuron-Methyl	Growth Regulator	0.96	0.00
Benzyladenine	Growth Regulator	0.83	0.00
N-Octyl Bicycloheptene Dicarboximide	Insecticide	0.73	0.00
Crotoxyphos	Insecticide	0.60	0.00
Kinoprene	Insecticide	0.59	0.00
Diflubenzuron	Adjuvant	0.50	0.00
Cyromazine	Insecticide	0.34	0.00
Gibberellic Acid	Growth Regulator	0.27	0.00
Glycolic Acid	Herbicide	0.23	0.00

Pesticide	Pesticide Type	Quantity (kg)	Proportion (%)
6-Benzylaminopurine (or: 6-Benzyladenine)	Growth Regulator	0.20	0.00
Azamethiphos	Insecticide	0.12	0.00
Fenthion	Insecticide	0.10	0.00
Rotenone	Insecticide	0.08	0.00
Uniconazole-p	Growth Regulator	0.03	0.00
Diphacinone	Rodenticide	0.02	0.00
Brodifacoum	Rodenticide	0.01	0.00
Bromadiolone	Rodenticide	0.01	0.00
(Z)-9-Tricosene	Insecticide	0.01	0.00
Difethialone	Rodenticide	0.01	0.00
Pyridate	Herbicide	0.00	0.00
Ancymidol	Growth Regulator	0.00	0.00
TOTAL		441,608.63	100.00

As of 2001, the use of lindane and parathion was discontinued in Canada.

Appendix 11: Prince Edward Island

Source: Reeves, D. 2003.

2002 PESTICIDE SALES REPORT

Don Reeves, Pesticide Regulatory Program
Department of Environment and Energy
07 November 2003

As a requirement under the *Pesticides Control Act* and Regulations, the P.E.I. Department of Environment and Energy collects and compiles information regarding the volume of pesticide sales conducted by licensed pesticide vendors. The 2002 sales report is based on sales that occurred during the 2002 calender year. Sales figures have been sorted on the basis of three principal pesticide types (herbicides, insecticides, and fungicides) (Table 1), and on specific active ingredients.

Table 1. SALES REPORTED BY PESTICIDE TYPE

PESTICIDE TYPE	AMOUNT SOLD IN 2002	ACTIVE INGREDIENTS	REGISTERED PRODUCTS
Herbicides	111,237 Kg of AI*	59	174
Insecticides	35,004 Kg of AI*	25	58
Fungicides	667,862 Kg of AI	29	70
TOTALS	814,103 Kg of AI*	113	302

* Does not include mineral oil formulations

During the 2002 crop year, herbicide sales, as recorded in Table 2, decreased somewhat (7.3%) from 2001. This represents a continuation of a trend that began in 2000. While still accounting for over 50% of the pesticide totals sold in the province, the number of active ingredients and registered formulations sold for weed control in 2002 were down by 2 and 8, respectively, from the previous year.

As was the case in 2001, insecticide sales declined significantly in 2002, with a recorded decrease of 19.5% over the previous year. On an equally positive note, the sale of insecticides in Prince Edward Island remains down by 67.6% from 1993. The number of active insecticide ingredients and registered insecticide formulations sold on P.E.I. in 2001 decreased by 5 and 15, respectively. *This decrease in insecticide sales may be attributed to the use of improved crop scouting techniques, the adoption of IPM techniques, the more widespread use of potato seed piece treatments and, specifically, the 'in-furrow' application on potato land of a pesticide developed to combat Colorado potato beetles. Subsequently, this reduced the need for multiple foliar applications of other insecticide products.*

In a reversal of the 2000–2001 trends, fungicide sales increased slightly in 2002. The total of 667,862 kg of active ingredient sold in 2002 represents a 7.3% increase over the 662,538 kg of active ingredient sold the previous year. Compared with 1993 data, fungicide sales in 2002 remain some 71.2% higher (Table 3). The total number of active fungicide ingredients and registered formulations recorded as sold in 2002 were down by 2 and 8, respectively, from the previous year. *Most fungicides used on Prince Edward Island are applied for the control of early and/or late blight in potatoes. As the summer of 2001 was unusually dry, blight was not a large problem and the amount of fungicide applied was low compared with earlier years. The 2002 crop season saw a return to more normal rainfall, an increased risk of blight, and thus higher levels of fungicide application.*

Due to the slight increase in the sale of fungicide formulations and the continued decrease in insecticide sales, the total pesticide sales volume for 2002 increased some 3.6% from 2001. Two fungicide active ingredients accounted for 74.0 % (602,446 kg) of the year's total pesticide sales.

Table 2. PERCENT CHANGE IN PESTICIDE SALES FROM 2001 TO 2002

	2002 (kg of A.I.)	2001 (kg of A.I.)	% Change
Herbicides	111,237	119,951	-7.3
Insecticides	35,004	43,489	-19.5
Fungicides	667,862	622,538	+7.3
TOTAL	814,103	785,978	+3.6

Table 3. PERCENT CHANGE IN PESTICIDE SALES FROM 1993 TO 2002

	2002 (kg of A.I.)	1993 (kg of A.I.)	% Change
Herbicides	111,237	104,000	+7.0
Insecticides	35,004	108,000	-67.6
Fungicides	667,862	390,000	+71.2
TOTAL	814,103	602,000	+35.2

Table 4. CROP ACRES IN P.E.I.

	2002	2001	2000	1993
Potato	107,000	108,000	109,000	87,000
Wheat	28,000	23,000	25,500	22,000

Oats	11,000	7,000	12,000	10,000
Barley	90,000	97,000	91,000	81,000
Mixed Grain	17,000	16,000	14,000	24,000
Soybeans	7,000	10,000	5,500	19,000
Tame Hay	143,000	130,000	133,000	121,000
Apples[†]	90	90	85	
Blueberries[†]	8,000	7,780[r]	7,295[r]	
Cranberries[†]	91	87	80	
Strawberries[†]	280	300[r]	300[r]	
Cabbage[†]	185	200[r]	160[r]	
Carrots[†]	665	X	650	
Rutabagas and Turnips[†]	450	551[r]	445	
TOTAL ACRES	412,761	400,008	399,015	364,000

†	data supplied by Statistics Canada and the P.E.I. Department of Agriculture, Fisheries, Aquaculture and Forestry
X	confidential data
r	revised from last publication

SALES REPORTED BY ACTIVE INGREDIENT

Note: Active ingredients within each class are reported in alphabetical order, not by sales volume.

Group A: (sales of each active ingredient greater than 50,000 kg)

- Chlorothalonil (TET)	(fungicide)
- Mancozeb (MCZ)	(fungicide)

Group B: (sales of each active ingredient between 10,000 and 50,000 kg)

- Diquat (DIQ)	(herbicide)
- MCPA present as amine salts (MAB)	(herbicide)
- Metalaxyl-m (MFN)	(fungicide)
- Metiram (MTR)	(fungicide)
- Sodium metaborate tetrahydrate (SMT)	(herbicide)

Group C: (sales of each active ingredient between 1,000 and 9,999 kg)

- 1,3-Dichloropropene (DSG)	(insecticide)
- Atrazine (ATR)	(herbicide)
- Azoxystrobin (AZY)	(fungicide)
- Bacillus thuringiensis (BTB)	(biological insecticide)
- Carbofuran (CAF)	(insecticide)
- Copper, present as cupric hydroxide (CUZ)	(fungicide)
- Dimethoate (DIM)	(insecticide)
- Endosulfan (ESF)	(insecticide)
-Fluazifop-p-butyl (FZA)	(herbicide)
- Glufosinate ammonium (GLG)	(herbicide)
- Glyphosate (GPS)	(herbicide)
- Glyphosate (GPT)	(herbicide)
- Hexazinone (VPR)	(herbicide)
- Imidacloprid (IMI)	(insecticide)
- Linuron (LUN)	(herbicide)
- MCPA present as esters (MAE)	(herbicide)
- MCPA present as potassium salt or as sodium salt (MAS)	(herbicide)
- Methamidophos (MOM)	(insecticide)
- Metobromuron (MTB)	(herbicide)
- Metribuzin (BAX)	(herbicide)
- Paraquat (PAQ)	(herbicide)
- Propiconazole (PON)	(fungicide)
- Rimsulfuron (DPY)	(herbicide)
- Sodium chlorate (SCL)	(herbicide)
- Thiabendazole (TZL)	(fungicide)
- Thiophanate-methyl (TPM)	(fungicide)

NOTE: Due to the wide variance in properties among pesticides, the amount of active ingredient is only one factor of many that needs to be considered when assessing risk. Other factors, such as the product toxicity, exposure patterns, exposure amounts, chemical family, and individual susceptibility, must also be considered. It is important to remember that all pesticides must undergo a thorough scientific review prior to being registered by Health Canada for use in Canada.

Appendix 12: Newfoundland and Labrador

Source: Government of Newfoundland and Labrador, Department of Environment and Pollution, 2003.

Table 43: Quantities of pesticide active ingredients used in Newfoundland and Labrador in 2003. Top 10 are in **bold.**

Active Ingredient	Pesticide Type	Amount Used (kg)	Proportion (%)
Diazinon	**Insecticide**	**19827.12**	**46.76**
B.t. Serotype H-14	**Insecticide**	**9428.00**	**22.24**
Resmethrin	**Insecticide**	**3900.00**	**9.20**
Siloxylated polyether	**Adjuvant/surfactant**	**2833.28**	**6.68**
2,4-D	**Herbicide**	**2182.67**	**5.15**
Carbaryl	**Insecticide**	**941.64**	**2.22**
Mecoprop	**Herbicide**	**567.81**	**1.34**
Glyphosate	**Herbicide**	**428.83**	**1.01**
Terbacil	**Herbicide**	**400.00**	**0.94**
Piperonyl Butoxide	**Insecticide**	**342.74**	**0.81**
Picloram	Herbicide	334.36	0.79
Permethrin	Insecticide	269.48	0.64
Quintozene	Fungicide	202.50	0.48
Diflubenzuron	Adjuvant/surfactant	104.75	0.25
Dicamba	Herbicide	89.25	0.21
Iprodione	Fungicide	77.11	0.18
Chlorothalonil	Fungicide	76.00	0.18
Thiram	Fungicide	64.00	0.15
Pyrethrins	Insecticide	61.64	0.15
Propiconazole	Fungicide	55.29	0.13
Triclopyr	Insecticide	47.04	0.11
Carbathin	Fungicide	25.60	0.06
Dimethoate	Insecticide	24.09	0.06
Mineral Oil (insecticidal)	Insecticide	19.78	0.05
B.t. berliner ssp kurstaki	Insecticide	15.00	0.04
Imazapyr	Herbicide	14.40	0.03
Methoprene	Insecticide	14.36	0.03
Soap	Insecticide	10.50	0.02
Oxycarboxin	Fungicide	6.40	0.02
Natural gum resins	Insecticide	5.00	0.01
Cyfluthrin	Insecticide	4.82	0.01
Polybutene	Repellent	4.69	0.01
Simazine plus related active triazines	Herbicide	4.45	0.01
Chlorpyrifos	Insecticide	4.32	0.01
Propoxur	Insecticide	2.88	0.01
Myclobutanil	Fungicide	2.58	0.01

Active Ingredient	Pesticide Type	Amount Used (kg)	Proportion (%)
Silica aerogel	Insecticide	2.00	0.00
2,2-dibromo-3-nitrilopropionamide	Anti-microbial	1.51	0.00
Benomyl	Fungicide	1.00	0.00
Abietivirus	Insecticide	1.00	0.00
Azoxystrobin	Fungicide	0.50	0.00
Etridiazole	Herbicide	0.50	0.00
Diquat	Herbicide	0.48	0.00
Bendiocarb	Insecticide	0.45	0.00
Zinc Phosphide	Rodenticide	0.17	0.00
Propethamphos	Insecticide	0.11	0.00
Hydramethylnon	Insecticide	0.09	0.00
Bromadiolone	Rodenticide	0.05	0.00
Pirimicarb	Insecticide	0.03	0.00
Brodifacoum	Rodenticide	0.02	0.00
Diphacinone	Rodenticide	0.01	0.00
S-methoprene	Insecticide	0.01	0.00
Cholecalciferol	Rodenticide	0.00	0.00
Difethialone	Rodenticide	0.00	0.00
Acephate	Insecticide	0.00	0.00
TOTAL		**42,400.33**	**100.00**

Table 44: Pesticides used in Newfoundland and Labrador in 2003

PCP NO	Trade Name	Active Ingredient	Guarantee	Classification	Type	Volume Used	Quantity of ai (kg)
	Abietivirus	Abietivirus		Research	Insecticide	1000	1
25673	Tempo 20 WP	Cyfluthrin	20%	C(I)	Insecticide	24,102	4.8204
24247	Konk hornet & wasp	Resmethrin	0.25%	D	Insecticide	9750	390000
26585	Eagle	Myclobutanil	40%	C(I)	Fungicide	6460	2.584
19241	Teknar HP-D	B.t.Serotype H-14	1200 ITU/MG%	R	Insecticide	6000	6000
9007	Tordon 101	Picloram 2,4-D	65g/L 240 g/L	C(I)	Herbicide	5,144	334.36 1234.56
15825	Tanglefoot	Polybutene	97%	D	Bird Repellent	4840	4.6948
11889	Diazinon 500 E	Diazinon	500g/L	C(I)	Insecticide	4590	2295
23078	Sylgard 309	Siloxylated polyether	76%	C(I)	Adjuvant	3728	2833.28
18325	Magic Mist PY9	Pyrethrins Piperonyl Butoxide	1.80% 10.00%	C(I)	Insecticide	3420	61.56 342
26860	Aquabac XT	B.t.Serotype H-14		R	Larvicide	2900	2900
18963	Trillion	2, 4-D Mecoprop Dicamba	19% 10% 1.80%	C(I)	Herbicide	2495	474.05 249.5 44.91
19531	Sevin XLR	Carbaryl	42.80%	C(I)	Insecticide	2200	941.6
11934	Diazinon 500 EC*	Diazinon	500g/L	C(I)	Insecticide	1850	925
19810	Par III	2,4-D DMA salt; Mecoprop Dicamba	190g/L 100 g/L 18 g/L	C(I)	Herbicide	1820	345.8 182 32.76
15368	ZP	Zinc Phosphide	10%w	R	Rodenticide	1700	0.17

PCP NO	Trade Name	Active Ingredient	Guarantee	Classification	Type	Volume Used	Quantity of ai (kg)
23494	Fungicide X	Iprodione	1.30%	C(I)	Fungicide	799	10.387
22676	Altosid	Methoprene	2.10%	R	Insecticide	684	14.364
25149	Catalyst	Propethamphos	18%	R	Insecticide/Acaracide	616	0.11088
21573	Precor 1%	S-methoprene	1.20%	C(I)	Insecticide	610	0.00732
9811	Killex	2,4-D MCPP Dicamba	19% 20% 1.90%	C(I)	Herbicide	540	102.6 108 10.26
26863	Aquabac 200G	B.t.Serotype H-14		R	Larvicide	528	528
23069	Ambush	Permethrin	12.5g/L	D	Insecticide	500	6.25
10628	SINBAR (R)	Terbacil	80%	C(A)	Herbicide	500	400
25423	Final Blox (R)	Brodifacoum	0.01%	C(I)	Rodenticide	440	0.022
13816	Dimilin	Diflubenzuron	25%	C(I)	Insecticide	419	104.75
13644	Round-Up	Glyphosate	356g/L	C(A)	Herbicide	411	146.316
15286	Maki	Bromadiolone	0.01%	C(I)	Rodenticide	390	0.000195
22239	Contrac Blox	Bromadiolone	0.01%	C(I)	Rodenticide	364	0.000182
24469	Prelude(R)	Permethrin	500g/L	C(I)	Insecticide	337	168.5
12461	Diazinon 500*	Diazinon	50%	C(I)	Insecticide	326	16300
9801	Cygon 2E*	Dimethoate	240 g/L	D	Insecticide	300	0.072
26172	Vantage	Glyphosate	356 g/L	C(A/I)	Herbicide	292	103.952
26171	Vantage Plus	Glyphosate	360 g/L	C(A/I)	Herbicide	290	104.4
24379	Rovral Green	Iprodione	240 g/L	C(I)	Fungicide	278	66.72
11425	Quintozene	Quintozene	75%	C(A)	Fungicide	270	202.5
21568	Acecap 97	Acephate	0.77%	C(I)	Insecticide	263	0.0020251
24030	Topas 250E	Propiconazole	250 g/L	C(I)	Fungicide	208	52
25344	Round-Up	Glyphosate acid	360 g/L	C(A&I)	Herbicide	206	74.16
22134	Ditrac Blox	Diphacinone	0.01%	C(I)	Rodenticide	200	0.01
14378	Ficam W 80%	Bendiocarb	80%	R	Insecticide	185	0.148

PCP NO	Trade Name	Active Ingredient	Guarantee	Classification	Type	Volume Used	Quantity of ai (kg)
15724	Daconil 2787	Chlorothalonil	500 g/L %	C(I)	Fungicide	152	76
24175	Dragnet FT	Permethrin	384 g/L	C(I)	Insecticide	149	57.216
10915	Mecoprop 300	Mecoprop	150 g/L	C(I)	Herbicide	140	21
13431	Arrest - 75W	Oxycarboxin Thiram Carbathin	5% 50% 20%	C(A)	Fungicide	128	6.4 64 25.6
16518	Diazinon 50 EC	Diazinon	500 g/L	C(I)	Insecticide	120	227.124708
18295	Killex	Dicamba 2,4-D Mecoprop	0.02% 0.19% 0.09%	D	Herbicide	120	0.024 0.228 0.108
15676	Rat XB7	Bromadiolone	0.005%	C(I)	Insecticide	120	0.006
20259	Maki Pack	Bromadiolone	0.005%	C(I)	Rodenticide	110	0.0055
26618	Generation	Difethialone	0.0025%	C(I)	Rodenticide	100	0.0025
19395	Tri-Kil*	Dicamba 2,4-D Mecoprop	9g/L 95 g/L 50 g/L	D	Herbicide	100	0.9 9.5 5
21053	Garlon 4	Triclopyr	480 g/L	C(I)	Herbicide	98	47.04
11935	Diazinon 500 E*	Diazinon	500 g/L	C(I)	Insecticide	90	45
14882	Ambush 500 EC	Permethrin	500g/L	C(A)	Insecticide	75	37.5
23713	Arsenal	Imazapyr	240 g/L	C(I)	Herbicide	60	14.4
10337	C-I-L Cygon 2 E	Dimethoate	240 g/L	D	Insecticide	60	0.0144
22793	Pirliss 50 DF	Pirimicarb	50%	C(A)	Insecticide	52	0.026
9382	Lagon 480E	Dimethoate	480 g/L	C(I)	Insecticide	50	24
20258	Maki Pellets	Bromadiolone	0.01%	C(I)	Rodenticide	45	0.0045
26146	Diazinon600EW	Diazinon	600 g/L	C(A)	Insecticide	40	24
16080	Ficam D 1%	Bendiocarb	1.00%	C(I)	Insecticide	30	0.3
27003	Banner MAXX	Propiconazole	14.30%	C(I)	Fungicide	23	3.289
14725	Amsol 2,4-D Amine 500	2,4-D amine salts	470 g/L	C(I)	Herbicide	22	10.34
24418	Diazinon 500	Diazinon	500 g/L	C(A)	Insecticide	22	11

PCP NO	Trade Name	Active Ingredient	Guarantee	Classification	Type	Volume Used	Quantity of ai (kg)
	EC						
10443	Dormant Oil	Mineral Oil (insecticidal)	98.90%	D	Insecticide	20	19.78
13106	Tanglefoot	Natural gum resins	25%	D	Insecticide	20	5
19400	Tri-Kil	Dicamba 2,4-D Mecoprop	18 g/L 190 g/L 100 g/L	C(I)	Herbicide	20	0.36 3.8 2
10233	Baygon Liquid Concentrate	Propoxur	180 g/L	C(I)	Insecticide	16	2.88
16064	Ratak+	Brodifacoum	0.01%	C(A)	Rodenticide	16	0.0016
26508	DiPel 2X DF	Bt berliner ssp kurstaki	32,000 IU/ mg%	C(I)	Insecticide	15	15
1268	Sanex High Test	Piperonyl butoxide Pyrethrins	1.33% 0.17%	C(I)	Insecticide	15	0.1995 0.0255
14669	Insecticidal Soap	Soap	50.50%	C(A)	Insecticide	10	5.05
14668	Insecticidal Soap	Soap	50.50%	D	Insecticide	10	5.05
15255	Drione	Piperonyl butoxide Pyrethrins Silica aerogel	10.00% 1.00% 40.00%	C(I)	Insecticde	5	0.5 0.05 2
25831	NUFOS 4E	Chlorpyrifos	480 g/L	C(A)	Insecticide	5	2.4
16370	Princep Nine-T	Simazine plus related active triazines	89%	C(I)	Herbicide	5	4.45
19732	Quintox	Cholecalciferol	0.08%	C(I)	Rodenticide	5	0.004
23352	The Exterminator	Piperonyl butoxide Pyrethrins	1.00% 0.02%	D	Insecticide	4.5	0.045 0.0009
24414	Dursban*	Chlorpyrifos	480 g/L	C(I)	Insecticide	4	1.92
9350	Killex	Dicamba	9 g/L	D	Herbicide	4	0.036

PCP NO	Trade Name	Active Ingredient	Guarantee	Classification	Type	Volume Used	Quantity of ai (kg)
		2,4-D Mecoprop	95g/L 50g/L				0.38 0.2
24239	Maxforce Roach Killer Bait	Hydramethylnon	2.15%	C(I)	Insecticide	4	0.086
9547	2,4-D Amine 500	2, 4-D	470 g/L	C(I)	Herbicide	3	1.41
23048	Biomate*	2,2-DIBROMO-3-NITRILOPROPIONAMIDE	20.00%		Algicide 731	2	1.51416472
26396	REGLONE Desiccant	Diquat	240 g/L	C(A)	Herbicide	2	0.48
13640	Round-Up**			C(I)	Herbicide	2	
18360	Sevin	Carbaryl	2%	D	Insecticide	2	0.04
11061	Tersan 1991	Benomyl	50%	C(I)	Fungicide	2	1
20564	Trounce	Pyrethrins Soap	0.20% 20.00%	D	Insecticide	2	0.004 0.4
12222	Truban	Etridiazole	25.00%	C(I)	Fungicide	2	0.5
21461	Diazinon**			C(I)	Insecticide	1	
26155	Heritage	Azoxystrobin	500 g/kg %	C(I)	Fungicide	1	0.5
16688	Pounce	Permethrin	384 g/L	C(I)	Insecticide	1	0.010886217

Appendix 13: The Yukon

Source: Hall, R., J. Hicklin and D. Wilson. 1995.

Table 45: Estimated quantities of pesticides sold or used in the Yukon in 1994. (Hall *et al.*, 1995). Data based on actual records from vendors and estimates from vendors without records.

Active Ingredient	Quantity (kg) Sold	Quantity (kg) Used	Type
Creosote	683.59	6.00	Wood preservative
2,4-D	45.46	0.14	Herbicide
Mecoprop	24.20		Herbicide
Zinc naphtenate	20.06		Wood preservative
Glyphosate	6.10	7.13	Herbicide
Dicamba	4.53		Herbicide
Copper naphtenate	3.96		Wood preservative
Mineral oil	1.21		Insecticide
Chlorpyrifos	1.05	0.00	Insecticide
Diazinon	0.65	0.66	Insecticide
Fatty acids	0.60		Herbicide
Thiram	0.60		Repellent
Asphalt	0.49		Insecticide
Resmethrin	0.48		Insecticide
Sulphur suphide	0.46		fungicide
Bromacil	0.43		Herbicide
Potassium salts of fatty acids	0.37		Insecticide
Alkanolamine salts of fatty acids	0.25		Insecticide
Piperonyl butoxide	0.23		Insecticide
Dimethoate	0.21	0.07	Insecticide
Lemon grass	0.19		Repellent
Malathion	0.19	22.74	Insecticide
Methyl nonyl ketone	0.18		Repellent
Soap	0.09		Insecticide
Pyrethrin	0.08	0.01	Insecticide
Borax	0.07		Insecticide
Ammonia soaps	0.02		Repellent
Benzyidiethyl	0.01		Repellent
Mustard oil	0.01		Repellent
Allethrin	0.00	0.00	Insecticide
Oxine benzoate	0.00		fungicide
Methyl ammoniumsaccharide	0.00		Repellent
Naphtalene	0.00		Repellent

Silicon dioxide	0.00		Insecticide
B.t.israelensis		8828.00	Insecticide
Brodifacoum		0.00	rodenticide
Bromadiolone		0.27	rodenticide
Diphacinone		0.01	rodenticide
Rotenone		2.22	piscicide
Triclopyr		0.10	Herbicide